

Title	DIAS Annual Report 2014
Creators	DIAS, Council
Date	2014
Citation	DIAS, Council (2014) DIAS Annual Report 2014. Communications of the Dublin Institute for Advanced Studies.
URL	<a href="https://dair.dias.ie/id/eprint/123/">https://dair.dias.ie/id/eprint/123/</a>



# **DUBLIN INSTITUTE FOR ADVANCED STUDIES**

INSTITIÚID ARD-LÉINN  
BHAILE ÁTHA CLIATH



# CONTENTS

Chairman's Statement	2
School of Celtic Studies	4
School of Cosmic Physics	16
School of Theoretical Physics	28
Administration and Finance	38
Staff	40
Financial Statements	45

---

# CLÁR

Ráiteas an Chathaoirligh	3
Scoil an Léinn Cheiltigh	5
Scoil na Fisice Cosmaí	17
Scoil na Fisice Teoiriciúla	29
Riarachán agus Airgeadas	39
An Fhoireann	40
Ráitis Airgeadais	63

# Chairman's Statement

This summary report gives a general overview of the research carried out in DIAS in 2014. More detailed information on the research activities of each of the Schools can be found in their School Research Reports which are available on the DIAS website.

I would like first of all to take this opportunity to pay tribute to three of our Senior Professors who retired at the end of the year for the major contribution they have made to DIAS and to the advancement of their respective subject areas. Professor Fergus Kelly, an acknowledged expert on early Irish law, served in the School of Celtic Studies since 1968. His studies of Irish law texts from the seventh and eighth century gives us a fascinating insight into different aspects of early Irish life. His new publication gives a very interesting account on the resolution of legal disputes within marriages. The School had a one-day law conference in his honour which attracted participants from the world of law and academia. Professor Pádraig Breatnach, who also worked in the School of Celtic Studies from 2006, is an authority on the palaeography and scribal history of medieval and early modern Irish. His recent publication on the work of The Four Masters documents the scribal styles and independent manuscript legacy of the two most outstanding compilers of the Annals. Professor Alan Jones, who retired in Feb. 2015, served as the Head of the Geophysics section since 2003. In his time here Professor Jones was successful in attracting a significant level of external funding and he significantly enhanced the research base and profile of the Section. He also developed many partnerships and linkages with other institutions. Fortunately, DIAS was able to fill this post with an excellent Geophysicist, Professor Chris Bean and we look forward to his work in the coming years. The filling of the posts in the School of Celtic Studies will be a priority for the coming year.

For a research institute which is at the forefront of its specialist areas of research, quality and excellence in research is always a primary consideration. Every five years, a review of the research of the constituent Schools is undertaken by a panel of international experts who present their findings to Council. A review was undertaken in 2014 on the work of the Schools and the findings of the respective Panels illustrate the high quality research that was carried out by the Schools against a backdrop of contracting resources. The recommendations of the Panel will be very helpful to DIAS in framing its new strategy.

DIAS is working to diversify its funding base. Given the low level of support for basic research at national level, researchers are being encouraged and supported in applying for alternative sources of funding. The School of Cosmic Physics was successful in getting ERC funding last year and the aim is now to build on this. A new Foundation, called the "Friends of

DIAS" has been formally established with the aim of raising additional funds for particular projects and initiatives. The narrow focus of the Government's funding policy is a particular concern for our scientists. DIAS and the research community in general needs to be able to attract world class researchers. Together with our University colleagues, we have continued to highlight this issue and hope that the new Strategy for Science & Innovation will include funding support for basic research.

Each of the Schools held various research workshops and conferences on topics under investigation. During 2014 the School of Celtic Studies had its triennial Summer School which attracted a large attendance of scholars from all around the world. There was also a number of outreach events aimed at the general public, including a lecture by the world renowned physicist, Professor Freeman Dyson [Institute of Advanced Study, Princeton] who enlightened his audience with his theories on Artificial Intelligence. In February of 2014 we were delighted to host a symposium organised in cooperation with the Japanese Embassy on lessons learned from the great East Japan earthquake of 2011 and the devastating tsunami it generated. The occasion was marked with a visit to the Institute by the Japanese Ambassador to Ireland. In April of 2014 the Austrian Ambassador to Ireland also visited the Institute. His visit reflects the strong ties that exist between DIAS and Austria.

Finally, I would like to congratulate the Director of the School of Theoretical Physics, Professor Werner Nahm who has added another prestigious award to his name. The Royal Irish Academy awarded him the 2014 Gold Medal for Physical and Mathematical Sciences. The award recognises his contribution to a wide range of fields but especially mathematical physics.



*Chairman of Council, Dr. Vincent Cunnane.*

---

*Cathaoirleach na Comhairle, An Dr. Vincent Cunnane.*

---

# Ráiteas an Chathaoirligh

Tugann an tuarascáil achomair seo léargas ginearálta ar an taighde a rinneadh DIAS sa bhliain 2014. Is féidir eolas níos mionsonraithe ar ghníomhaíochtaí taighde na Scoileanna uile a fháil ina dTuarascálacha Taighde Scoile atá ar fáil ar shuíomh gréasáin DIAS.

I dtús báire ba mhaith liom an deis seo a thapú le hómós a thabhairt do thriúr d'ár nOllúna Sinsearach a chuaigh ar scor ag deireadh na bliana as an gcion fíorshuntasach a rinne siad do DIAS agus don chur chun cinn ina réimsí ábhair faoi seach. D'fhreastal an tOllamh Fergus Kelly, saineolaí aitheanta i ndlí luath na hÉireann, i Scoil an Léinn Cheiltigh ó 1968. Tugann an staidéir ar théacsanna dlí na hÉireann ón seachtú haois agus ón ochtú haois léargas fíorshuimiúil ar ghnéithe éagsúla de shaol luath na hÉireann. Tugann a fhoilseachán nua cur síos an-shuimiúil ar réiteach ar dhíospóidí dlí laistigh de phóstaí. Bhí comhdháil lae ag an Scoil in ómós dó a mheall rannpháirtithe ó dhomhan an dlí agus ó dhomhan an léinn. Saineolaí is ea an tOllamh Pádraig Breatnach, a d'oibrigh freisin o Scoil an Léinn Cheiltigh ó 2006, ar pailéagrafaíocht agus stair scríbhinne na meán-Ghaeilge agus na Nua-Ghaeilge Moiche. Tugann a fhoilseachán le déanaí ar shaothar na gCeithre Máistrí cur síos ar na stíleanna scríbhinne agus oidhreacht lámhscríbhinne neamhspleách ag an mbeirt tiomsaitheoirí is túisce de na hAnnála. D'fhreastal an tOllamh Alan Jones, a chuaigh ar scor i bhFeabhra na bliana 2015, mar Cheann ar rannóg na Geoifisice ó 2003. Le linn a chuid ama anseo d'éirigh leis an Ollamh Jones leibhéal suntasach de mhaoiniú seachtrach a fháil agus chuir sé go mór le bonn taighde agus le próifíl na Rannóige. D'fhorbair sé neart páirtíochtaí agus naisc le hInstitiúidí eile. Ar an dea-uair, bhí DIAS ábalta an post seo a líonadh le Geoifisiceoir den scoth, an tOllamh Chris Bean agus táimid ag tnúth lena shaothar sna blianta seo romhainn. Beidh líonadh na bpost i Scoil an Léinn Cheiltigh ina thosaíocht don bhliain seo atá ag teacht.

D'institiúid taighde atá chun tosaigh ina réimsí speisialtóireachta taighde, cuirtear cáiliúocht agus feabhas sa taighde san áireamh mar thosaíocht i gcónaí. Gach cúig bliana, déantar athbhreithniú ar thaighde na Scoileanna comhpháirteacha ag painéal de shaineolaithe neamhspleácha a chuireann a dtorthaí i láthair don Chomhairle. Rinneadh athbhreithniú sa bhliain 2014 ar shaothar na Scoileanna agus léiríonn tátail na bPainéal faoi seach an taighde ardchaighdeán a rinne na Scoileanna i gcúinsí ina raibh laghdú ar acmhainní. Cuideoidh moltaí an Phainéil go mór le DIAS chun a straitéis nua a chruthú.

Tá DIAS ag obair chun an bonn maoinithe a leathnú. I bhfianaise an leibhéil íseal do thaighde bunúsach ag an leibhéal náisiúnta, tá spreagadh agus tacaíocht á thabhairt do thaighdeoirí iarratais a dhéanamh ar fhoinsí malartacha maoinithe. D'éirigh le Scoil na Fisice Cosmaí maoiniú ERC a fháil anuraidh agus is í an aidhm anois tógáil air sin. Bunaíodh Fondúireacht nua, ar a nglaoitear "Cairde DIAS" go

foirmiúil d'fhonn maoiniú breise a fháil do thionscadail agus tionscnaimh ar leith. Ábhar imní ar leith d'ár n-eolaithe is ea an fócas cúng atá ag polasaí maoinithe an Rialtais. Ní mór do DIAS agus don phobal taighde i gcoitinne a bheith ábalta taighdeoirí den scoth a mhealladh. In éineacht lenár gcomhghleacaithe Ollscoile, leanamar d'aird a tharraingt ar an gceist seo agus tá súil againn go n-áireoidh an Straitéis nua um Eolaíocht & Nuálaíocht tacaíocht maoinithe don taighde bunúsach.

Thionól gach ceann de na Scoileanna ceardlanna agus comhdhálacha taighde éagsúla ar thopaicí ar a bhfuil taighde á dhéanamh. Le linn na bliana 2014 d'eagraigh Scoil an Léinn Cheiltigh a Scoil Samhraidh thríbhliantúil a mheall lucht freastal mór de scoláirí ó thimpeall an domhain. Bhí roinnt ócáidí for-rochtana ann freisin dírithe ar an bpobal i gcoitinne, lena n-áirítear léacht ag an bhfisiceoir cáiliúil am tOllamh Freeman Dyson (Institute for Advanced Studies, Princeton) a d'oil an lucht éisteachta lena theoricir ar an Intleacht Shaorga. I mí Feabhra na bliana 2014 bhí áthas orainn siompóisiam ea eagrú i gcomhar le hAmbasáid na Seapáine maidir le ceachtanna a foghlaimíodh ó chriath talún ollmhór na Seapáine Thoir in 2011 agus an súnámaí uafásach a ghin sé. Comóradh an ócáid le cuairt ar an Institiúid ag Ambasadóir na Seapáine ar Éirinn. In Aibreán na bliana 2014 thug Ambasadóir na hOstaire ar Éirinn cuairt ar an Institiúid freisin. Léiríonn a chairt na naisc láidre atá ann idir DIAS agus an Ostair.

Mar chríoch, ba mhaith liom comhghairdeas a ghabháil le Stiúrthóir Scoil na Fisice Teoiriciúla, an tOllamh Werner Nahm, a bhfuil gradam clúiteach eile bainte aige. Bhronn Acadamh Ríoga na hÉireann Bonn Órga 2014 d'Eolaíochtaí Fisice agus Matamaitice air. Tugann an gradam aitheantas as a shaothar i raon leathan réimsí ach go háirithe san fhisic mhatamaiticiúil.



Ambassador Dr. Thomas Nader with Cecil Keaveney  
(Registrar of DIAS)

An tAmbasadóir an Dr. Thomas Nader le Cecil Keaveney  
(Cláraitheoir DIAS)

# School of Celtic Studies

## RESEARCH

Liam Breatnach continued work on his edition of the Old Irish law tract *Córus Bésgnai*, as well as on a Grammar of Middle Irish. He also worked on preparing a number of papers for publication.

Pádraig Breatnach continued work on some eighteenth-century Munster poems for the series 'Togha na hÉigse 1700-1800'; continued editorial work for the *Apocrypha Hiberniae* project; continued to prepare the catalogue of Irish manuscripts in Brussels; worked on Festschrift contributions [1] 'Comhar na mban' (editions of 18th century verse) [2] 'A poem by Eochaidh Ó hEódhusa' (edition).

Fergus Kelly completed and sent to press his edition of an Old Irish text on legal disputes within marriage (D. A. Binchy, *Corpus Iuris Hibernici* i 144.5-150.16) for the Early Irish Law Series, and continued with an edition of an Early Modern Irish Legal Treatise attributed to the Connacht jurist Giolla na Naomh Mac Aodhagáin, who died in 1309 (D. A. Binchy, *Corpus Iuris Hibernici* ii 691.1-699.4).

Barry Lewis continued work on an edition of *Bonedd y Saint* [genealogical text on Welsh saints].

Aoibheann Nic Dhonnchadha continued research on the composition and contents of the collection of thirty Irish medical manuscripts, dating from the fifteenth and sixteenth centuries, that are housed in the Library of Trinity College, Dublin. Data compiled in previous years was revised and corrected during 2014.

Brian Ó Curnáin continued work on Modern Irish dialect studies, including the preparation of a monograph on East Galway Irish, and the transcription and editing of recorded materials for the GLÓR project.

Gordon Ó Riain continued work on a new edition of IGT V. This included work on a draft edition of portion of the tract with translation and commentary. He also worked on an edition with translation, notes and study of a previously unnoticed fragment of a tract on grammar and prosody inserted into UCD-OFM A 4, and a catalogue entry for part of the Yellow Book of Lecan.

Deborah Hayden continued work on an edition of a medieval Irish tract on grammatical and rhetorical doctrine associated with the text known as *Auraicept na nÉces*, as well as on an edition and translation of a medieval Irish medical text from

NLS MS 72.1.2. She also carried out work on re-cataloguing sections of the Yellow Book of Lecan as part of a collaborative project in the School of Celtic Studies.

Mona Jakob continued work on a project on rhyming pairs in Old and Middle Irish poetry and conceptual patterns that might be found therein. She worked on preparing an article 'Without rhyme or reason? Unusual rhyming pairs in Old and Middle Irish poetry' to be submitted for publication in March 2015.

Síle Ní Mhurchú continued research on the manuscript sources for the *dánta grádha*, and work on an edition of *Agallamh Oisín agus Phádraig*.

Nicole Volmering completed her PhD dissertation. She conducted research on the relation between the Second Vision of Adomnán, the 'scare' of AD 1096 and 'apocalypticism' in Ireland, and on the manuscripts containing the *Féilire Óengusso* and Stokes' editing policies, on the connection between *Visio Sancti Pauli*, Merovingian penitentials and the Irish concept of family ties in the ninth degree, as well as connections between visions and *immrama*.

Fangzhe Qiu worked on the final stage of his PhD thesis on early Irish law.

Mícheál Hoyne carried out research on his post-doctoral project editing the poems of the fifteenth-century poet Seifín Mór.



*Scoil Samhraidh 2015*

*Summer School 2015*



# Scoil an Léinn Cheiltigh

## TAIGHDE

Lean Liam Breatnach lena chuid oibre ar a eagrán den téacs dlí Sean-Ghaeilge *Córus Bésgnai*, mar aon le Gramadach na Meán-Ghaeilge, agus réitigh sé roinnt páipéar le haghaidh foilsithe.

Lean Pádraig Breatnach ag obair ar roinnt dánta Muimhneacha ón 18ú haois don tsraith 'Togha na hÉigse 1700-1800', ar obair eagarthóireachta don tionscnamh *Apocrypha Hiberniae*, ar chatalóg na lámhscríbhinní Gaeilge sa Bhruiséal, agus ar dhá alt i gcomhair féilscríbhinní [1] 'Comhar na mban' (eagrán de dhánta ón 18ú haois) [2] 'A poem by Eochaidh Ó hEódhusa' (eagrán).

Chríochnaigh Fergus Kelly a eagrán de théacs Sean-Ghaeilge ar dhíospóidí dlí laistigh de phósadh [D. A. Binchy, *Corpus Iuris Hibernici* i 144.5-150.16] agus cuireadh go dtí na clódóirí é le foilsiú san Early Irish Law Series, agus lean sé le heagrán de thráchtas dlí sa Nua-Ghaeilge Mhoch a bhaineann leis an dlí-eolaí Chonnachtach Giolla na Naomh Mac Aodhagáin, a fuair bás i 1309 [D. A. Binchy, *Corpus Iuris Hibernici* ii 691.1-699.4].

Lean Barry Lewis ag obair ar eagrán de *Bonedd y Saint* (téacs ginealach ar naoimh na Breataine Bige).

Lean Aoibheann Nic Dhonnchadha le taighde ar chomhdhéanadh agus ar ábhair an bhailiúcháin de thríocha lámhscríbhinn leighis Éireannacha, ón chúigiú agus séú haois déag, atá i Leabharlann Choláiste na Tríonóide, Baile Átha Cliath. Rinneadh athchóiriú agus ceartú ar ábhar a cuireadh le chéile le blianta anuas i gcaitheamh 2014.

Lean Brian Ó Curnáin ag obair ar staidéir ar chanúintí na Nua-Ghaeilge, lena n-áirítear monagraf ar Ghaeilge Oirthear na Gaillimhe, agus tras-scríobh agus eagarthóireacht ar ábhair thaifeadta do thionscadal GLÓR.

Lean Gordon Ó Riain le hobair ar eagrán nua de *Irish Grammatical Tracts V*, lena n-áirítear dréacht de eagrán de chuid den téacs le haistriúchán agus tráchttaireacht. Chomh maith leis sin rinne sé obair ar eagrán le haistriúchán, nótaí agus staidéar ar mhír de thráchtas ar ghramadach agus prosóid i lámhscríbhinn A 4 UCD-OFM nár tugadh faoi deara cheana, agus ar iontráil chatalóige i gcomhair cuid de Leabhar Buí Leacáin.

D'oibrigh Deborah Hayden ar eagrán de thráchtas meánaoiseach Gaeilge ar theagasc gramadaí agus reitriche a rangáítear leis an téacs *Auraicept na nÉces*, chomh maith le heagrán agus aistriúchán de théacs meánaoiseach leighis as an LS Leabharlann Náisiúnta na hAlban 72.1.2. Freisin rinne sí obair ar athchatalógú de chodanna de Leabhar Buí Leacáin, mar chuid de thionscnamh comhoibritheach sa Scoil.

Lean Mona Jakob ag obair ar a tionscadal ar phéirí ríme sa tSean-Ghaeilge agus sa Mheán-Ghaeilge agus ar na pátrúin choinceapúla a d'fhéadfaí a fháil iontu. D'ullmhaigh sí alt 'Without rhyme or reason? Unusual rhyming pairs in Old and Middle Irish poetry' le cur faoi bhráid irise i Márta 2015.

Lean Síle Ní Mhurchú ag obair ar thaighde ar fhoinsí lámhscríbhinní de dhánta grá na Gaeilge Clasaicí (*dánta grádha*), agus ar eagrán de *Agallamh Oisín agus Phádraig*.

Chríochnaigh Nicole Volmering a tráchtas Phd. Rinne sí taighde ar Dara Fís Adhomhnáin, imeachtaí in Éirinn sa bhliain 1096 agus an t-apacailipteachas, chomh maith le taighde ar lámhscríbhinní *Félire Óengusso*, ar *Visio Sancti Pauli* agus ar fiseanna agus *immrama*.

Rinne Fangzhe Qiu obair ar an gcuid deireanach dá thráchtas PhD ar an dlí Éireannach luath.

Rinne Mícheál Hoyne taighde ar a thionscnamh iar-dhochtóireachta, eadhón eagrán de dhánta an fhile Seifín Mór, a bhain leis an 15ú haois

## MEAMRAM PÁIPÉAR RÍOMHAIRE (ISOS)

Lean tionscadal Mheamram Páipéar Ríomhaire le hobair ar dhigitíú lámhscríbhinní agus ar uasghrádú an bhunachair sonraí ollmhór agus cartlann an ábhair dhigitithe atá ag ISOS. Rinneadh athnuachan i mbliana ar an gcomhoibriú le hAcadamh Ríoga na hÉireann le digitíú ar sé LSS ón 16ú haois agus iad a chur ar fáil ar an suíomh lín: LS 23 F 21, LS 23 N 8, LS C i 3, LS C ii 3, LS C iii 2 agus LS E i 3. Faoi am seo tá 75 LSS as bailiúchán an Acadaimh ar fáil ar an suíomh. Chomh maith leis sin cuireadh trí LSS as bailiúchán Choláiste na Tríonóide i n-airde ar an suíomh, eadhón, LS 1301 'Annála na gCeithre Máistrí', LS 1318 'Leabhar Buí Leacáin', LS 1319/2/7 [tráchtasí gramadaí] agus LS 1340 'Duanaire Thigh na Cille'. Tosaíodh ar dhigitíú ar 16 LSS i Leabharlann Óstaí an Rí, a chuirfear i n-airde ar an suíomh i gcaitheamh na bliana 2015. Rinneadh digitíú ar seacht LSS i Leabharlann Marsh, Z 2.2.1, Z 3.1.5, Z 3.1.7, Z 3.4.19, Z 3.5.3, Z 4.2.5, Z 4.5.6, agus cuireadh i n-airde ar an suíomh iad. Fuarthas 3.5 milliún iarratas don suíomh sa bhliain 2014.

## OGHAM IN 3D

Sa bhliain 2014 bhronn an tSeirbhís Séadchomharthaí Náisiúnta (NMS), an Roinn Ealaíon, Oidhreachta agus Gaeltachta tuilleadh tacaíochta airgeadais don tionscadal atá á chur i gcrích i gcomhar leis an gClár Fionnachtana. Rinneadh scanadh agus digitíú ar 26 cloch oghaim, agus as na 73 cloch oghaim atá faoi chúram an Stáit tá scanadh agus digitíú déanta ar 55 acu. Tá sé i gceist ar a laighead na 18 cloch oghaim ar liosta na Séadchomharthaí Náisiúnta i gCiarraí Theas a scanadh i gcaitheamh na bliana 2015.



### IRISH SCRIPT ON SCREEN (ISOS)

The Irish Script on Screen project continued work on digitisation of manuscripts and upgrading the huge database and archive of digitised material held by ISOS. This year brought a renewed partnership with the Royal Irish Academy, with six further 16th century manuscripts being digitized and going live on the Irish Script on Screen website: MS 23 F 21, MS 23 N 8, MS C i 3, MS C ii 3, MS C iii 2 and MS E i 3, totalling some 75 manuscripts on Irish Script on Screen from the Royal Irish Academy's collection to date.

Trinity College MS 1301 'The Annals of the Four Masters', MS 1318 'The Yellow Book of Lecan', MS 1319/2/7 Grammatical and MS 1340 'The Tinnakill duanaire' went live during the year.

Digitization began with sixteen manuscripts from King's Inns which will be going live sometime in 2015. Seven manuscripts from Marsh's Library, MS Z 2.2.1, MS Z 3.1.5, MS Z 3.1.7, MS Z 3.4.19, MS Z 3.5.3, MS Z 4.2.5, MS Z 4.5.6. were digitized and went live on the ISOS site.

The last year saw some 3.5 million requests on the ISOS website.

### OGHAM IN 3D

The National Monuments Service, Dept. of Arts, Heritage and the Gaeltacht, provided a further subvention for 2014 in support of the project being undertaken in cooperation with the Discovery Programme. In all 26 ogham stones were scanned in 2014. Of the 73 ogham stones in State Care, 55 have now been scanned and digitised to date. It is hoped to cover at least the remaining 18 ogham stones on the National Monuments list in Kerry South in 2015. The Ogham in 3D website is continuing to develop as a research tool. Over 80 ogham records have been digitised and it is expected to reach 100 by mid 2015, roughly a quarter of the total.

Nora White was successful in her application for Heritage Council funding to commission an archaeological assessment and report for the medieval church and multiple ogham stone site of Knockboy, Co. Waterford. The report was submitted to the Heritage Council in November.

A number of presentations were given by Nora White in connection with the project, namely, [13 February] to transition year students, [27 August] Heritage Week lecture in Dungarvan: 'Ogham in 3D and the Waterford ogham stones', [19 September] Culture Night at DIAS, [19 September]

Cultures of Stone conference, UCD: 'Ogham stones – uniquely Irish monuments precariously standing between pre-history and history', [31 October] lecture to Waterford Archaeological and Historical Society: 'Written in stone: the story of Ogham in Waterford'. In addition she submitted an article on the Ogham in 3D project, co-written with Fionnbarr Moore, Gary Devlin and Rob Shaw, to *Archaeology Ireland*, and 'Ogham in 3D: Digitizing a unique aspect of Ireland's cultural heritage' to *Breac: A Digital Journal of Irish Studies*.

### BIBLIOGRAPHY

Alexandre Guilarte continued to work on the compilation of the *Bibliography of Irish Linguistics and Literature (BILL)*, describing and analysing relevant contributions appearing in academic journals, monographs, and collective works. He also worked on the design of the bibliography website focusing on the design of a new comprehensive search interface. He gave a presentation on the BILL project within the forum 'Prospects and possibilities for Celtic Studies online', as part of the 36th University of California Celtic Studies Conference, UCLA, 13–16 March 2014. He contributed entries to appear in vols 47/2 and 48/1 of the *International Medieval Bibliography*, edited by the Institute for Medieval Studies, University of Leeds, published by Brepols.

### MANUSCRIPT STUDIES

Professor Liam Breatnach continued direction of a diplomatic edition of the early 15th-century manuscript *Leabhar Breac*, and began a project involving staff and scholars of the School to produce a new catalogue on the contents of the Yellow Book of Lecan.

### PUBLICATIONS

The year 2014 saw the publication of *Authorities and Adaptations: The Reworking and Transmission of Sources in Medieval Ireland*, edited by Elizabeth Boyle and Deborah Hayden, and of *The Art of Bardic Poetry. A new Edition of Irish Grammatical Tracts I*, by Eoin Mac Cárthaigh.

### LIBRARY

Current and retrospective cataloguing continued. Acquisitions continued in subject areas relevant to the research needs of the School. Regular updates on recent accessions and current periodicals [both print and online] were issued. Research and bibliographical queries from members of the School were dealt with. Inter-library loans were ordered, consulted and returned to the lending institution.

## Scoil an Lín Cheiltigh [ar leanúint]

Táthar ag leanúint ar an suíomh lín a fhorbairt mar uirlis taighde. Tá digitiú déanta ar bhreis agus 80 taifead oghaim, agus táthar ag súil leis go mbeidh 100 ceann déanta faoi lár 2015, thart ar an gceathrú cuid den iomlán.

D'éirigh le Nora White maoiniú a fháil ón Chomhairle Oidhreachta chun measúnú agus tuarascáil seandálaíochta a dhéanamh ar an ionad le heaglais mheánaoiseach agus clocha oghaim, An Cnoc Buí, Co. Phort Láirge. Cuireadh an tuarascáil faoi bhráid an Chomhairle Oidhreachta i mí na Samhna.

Thug Nora White roinnt cur i láthair maidir leis an tionscadal, eadhón, [13 Feabhra] do dhaltai idirbhliana, [27 Lúnasa] i gcomhair Seachtain na hOidhreachta i nDún Garbháin: 'Ogham in 3D and the Waterford ogham stones', [19 Meán Fómhair] i gcomhair an Oíche Chultúir ag an Institiúid Ard-Léinn, [19 Meán Fómhair] comhdháil 'Cultures of Stone', COBÁC: 'Ogham stones – uniquely Irish monuments precariously standing between pre-history and history', [31 Deireadh Fómhair] léacht do Chumann Seandálaíochta agus Staire Port Láirge: 'Written in stone: the story of Ogham in Waterford'. Chomh maith leis sin sholáthair sí alt ar an tionscadal oghaim a scríobh sí i bpáirt le Fionnbarr Moore, Gary Devlin agus Rob Shaw, i gcomhair *Archaeology Ireland*, agus alt ar 'Ogham in 3D: Digitizing a unique aspect of Ireland's cultural heritage' i gcomhair *Breac: A Digital Journal of Irish Studies*.

### BIBLEAGRAFAÍOCHT

Lean Alexandre Guilarte lena chuid oibre ar *Bibliography of Irish Linguistics and Literature [BILL]* a chur i dtoll a chéile, ag díriú ar anailís agus innéacsú ar theidil thréimhsiúla agus ag an am céanna ag cur líon mór iontrálacha nua isteach do leabhair agus monagraif ar staidéir theangeolaíoch na hÉireann. Chomh maith leis sin rinne sé obair ar leagan amach an tsuímh lín, ag díriú ar na huirlisí cuardaigh a fheabhsú.

Thug sé caint ar an tionscnamh laistigh den fhóram 'Prospects and possibilities for Celtic Studies online', mar chuid den 36th University of California Celtic Studies Conference, UCLA, 13–16 Márta 2014. Sholáthair sé iontrálacha do imleabhair 47/2 agus 48/1 den *International Medieval Bibliography*, in eagar ag an Institute for Medieval Studies, University of Leeds agus foilsithe ag Brepols.

### LÉANN LÁMHSCRÍBHINNÍ

Lean an tOllamh Liam Breatnach ag stiúradh eagrán dioplómaitiúil den lámhscríbhinn ó thús na 15ú haoise déag *An Leabhar Breac*, agus chuir sé tús le tionscnamh, ina bhfuil baill foirne agus scoláirí páirteach, chun catalóg nua a sholáthar do Leabhar Buí Leacáin.



Elizabeth Boyle and Deborah Hayden editors of *Authorities and Adaptations: The Reworking and Transmission of Textual sources in Medieval Ireland* at the launch on 26th September.

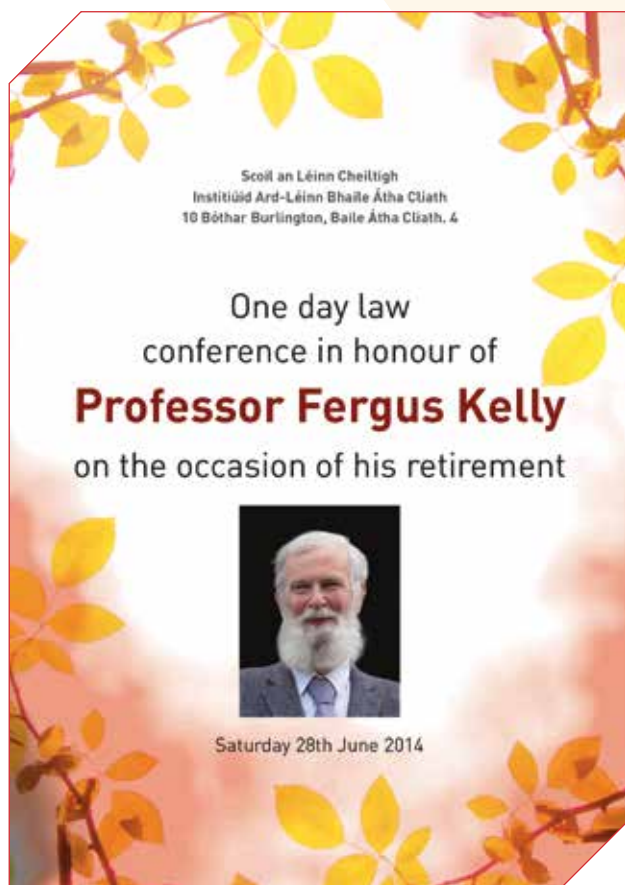
Elizabeth Boyle agus Deborah Hayden eagarthóirí *Authorities and Adaptations* ag an seoladh ar an 26ú Meán Fómhair.

### FOILSEACHÁIN

Foilsíodh i mbliana *Authorities and Adaptations: The Reworking and Transmission of Sources in Medieval Ireland*, in eagar ag Elizabeth Boyle agus Deborah Hayden, agus *The Art of Bardic Poetry. A new Edition of Irish Grammatical Tracts I*, le Eoin Mac Cárthaigh.

### LEABHARLANN

Leanadh le catalógú reatha agus siarghabhálach ar an leabharlann agus cuireadh taifid ar fáil don Chatalóg ar líne don Phobal. Leanadh le sealbhú i gcomhair réimsí ábhair a bhí ábhartha do riachtanais thaighde na Scoile. Eisíodh nuashonruithe rialta ar shealbhú a rinneadh le déanaí agus ar thréimhseacháin reatha agus déileáladh le ceisteanna taighde agus leabharliosta ó bhaill na Scoile agus ó chuairoteoirí.



*Comhdháil lae in onóir do Fergus Kelly.*

The Library Committee met in April and September. The Library Committee advises on library policies, promotion of the library and on development and implementation of strategic changes. Committee members are Liam Breatnach, Aoibheann Nic Dhonnchadha, Alexandre Guilarte and the Librarian [Margaret Irons/George Rogers].

### CULTURE NIGHT

The School of Celtic Studies hosted an event as part of Culture Night 2014 on Friday September 19. Dr Nora White presented a demonstration of the Ogham in 3D website, and Dr Aoibheann Nic Dhonnchadha gave a demonstration of the Irish Script on Screen project.

Also in the Lecture Room on the night was a rare books display as well as a display of books published by the Institute. After the speakers had concluded, guests were given the opportunity to interact with both the ISOS and Ogham software as well as to speak personally with the lecturers. The School welcomed 38 guests to the event.

### TIONÓL 2014

This year's Tionól again attracted a very wide audience, with an international panel of speakers. Attendance was high, with audiences reaching ninety people. The following papers were delivered [in order of presentation] on Friday the 14th: Peter McQuillan, "Politeness" and Eighteenth Century Literature in Irish; Torsten Dörflinger, Language Use and Attitudes towards Irish among Gaeltacht School Children in Co. Donegal: Evidence from a survey; Mícheál Hoyne, A Survey of *Brúilingeachd* Verse; Matthias Egeler, Icelandic Horses and the Grey of Macha; Mikael Males, Foundation Myths and their Rhetorical Consequences in the *Auraicept* and the Icelandic Third Grammatical Treatise; Marie-Luise Theuerkauf, Something borrowed...? *Tochmarc Emire*, the Book of Leinster, and *Dindshenchas Érenn*; Marina Snasareva, Consain chaola agus a n-úsáid ag cainteoirí Gaeilge mar an dara teanga; Caoimhín Breatnach, Brian Bórainmhe, 'Cogadh Gall ré Gaedhealaibh' and Foras Feasa ar Éirinn.

The following were delivered on Saturday the 15th: Éamon Ó Ciosáin, Writing the Breton Language: 'Institutions', Normalization and the Problem of a Standard; James McCloskey, Covert Modality in Irish Nonfinite Clauses with 'le'; Michael Clarke, International Influences on *Togail Troí* in the Later Middle Ages; Elizabeth Boyle, The Boyhood Deeds of David; Barry Lewis, Approaching the genealogies of the Welsh saints; Tom O'Donnell, St Findchú of Brigown, Children and a Response to Monastic Reform; Anders Ahlqvist, Messe agus Pangur Bán; Grace Neville, Flotsam and Jetsam: the Papers of Joseph Vendryes.

The Statutory Public Lecture held in conjunction with the Tionól, was delivered in UCD by Professor Liam Breatnach under the title 'The Church in the Laws of Early Mediaeval Ireland' on Friday the 14th of November. This was a well-attended lecture, and a recording is now available on the School's website.

### ONE DAY LAW CONFERENCE IN HONOUR OF PROFESSOR FERGUS KELLY

To mark the retirement of Professor Kelly and his major contributions to the study of early Irish law the Director, Professor Liam Breatnach, arranged a special conference at the Institute on Saturday the 28th of June. Each session lasted 45 minutes, and the following papers were delivered:

Thomas Charles-Edwards [University of Oxford]: '*Bretha Comaithchesa and Early Irish Farming*'.

Tháinig Coiste na Leabharlainne le chéile in Aibreán agus Meán Fómhair. Tugann an coiste comhairle ar pholasaí na leabharlainne, cur chun cinn na leabharlainne, agus forbairt agus cur i gcrích athraithe straitéiseacha. Is iad baill an choiste Liam Breatnach, Aoibheann Nic Dhonnchadha, Alexandre Guilarte agus an Leabharlannaí [Margaret Irons/George Rogers].

### OÍCHE CHULTÚIR

D'eagraigh foireann na leabharlainne rannpháirtíocht na Scoile san 'Oíche Chultúir' [D'é hAoine, 19 Meán Fómhair 2014].

Thug an Dr Nora White cur i láthair suíomh lín don tionscadal 'Ogham in 3D', agus thug an Dr Aoibheann Nic Dhonnchadha léiriú ar an tionscadal Meamram/Páipéar/Ríomhaire.

Chomh maith leis sin bhí taispeántas de leabhair annamha agus foilseacháin na hInstitiúide sa Seomra Léachta. Nuair a bhí deireadh leis na cainteanna, tugadh deis do na haíonna imoibriú a dhéanamh leis na mbogearra don dá thionscadal, agus labhairt go pearsanta leis na léachtóirí. Chuir an Scoil fáilte roimh 38 aoi ar an oíche.

### TIONÓL 2014

Tharraing Tionól na bliana seo lucht éisteachta an-leathan arís i mbliana, le painéal idirnáisiúnta cainteoirí. Rinneadh freastal an-ard, suas le nócha duine sa lucht éisteachta. Tugadh na páipéir seo leanas (san ord inar cuireadh i láthair iad) ar an Aoine an 14ú: Peter McQuillan, "Politeness" and Eighteenth Century Literature in Irish; Torsten Dörflinger, Language Use and Attitudes towards Irish among Gaeltacht School Children in Co. Donegal: Evidence from a survey; Mícheál Hoyne, A Survey of *Brúilingeachd* Verse; Matthias Egeler, Icelandic Horses and the Grey of Macha; Mikael Males, Foundation Myths and their Rhetorical Consequences in the Auraicept and the Icelandic Third Grammatical Treatise; Marie-Luise Theuerkauf, Something borrowed...? *Tochmarc Emire*, the Book of Leinster, and Dindshenchas Érenn; Marina Snesareva, Consain chaola agus a n-úsáid ag cainteoirí Gaeilge mar an dara teanga; Caoimhín Breatnach, Brian Bóraimhe, 'Cogadh Gall ré Gaedhealaibh' and Foras Feasa ar Éirinn.

Tugadh na cainteanna seo leanas ar an Satharn an 15ú: Éamon Ó Ciosáin, Writing the Breton Language: 'Institutions', Normalization and the Problem of a Standard; James McCloskey, Covert Modality in Irish Nonfinite Clauses with 'le'; Michael Clarke, International Influences on *Togail Troí* in the Later Middle Ages; Elizabeth Boyle, The Boyhood Deeds of David; Barry Lewis, Approaching the genealogies of the Welsh saints; Tom O'Donnell, St Findchú of Brigown, Children and a

Response to Monastic Reform; Anders Ahlqvist, Messe agus Pangur Bán; Grace Neville, Flotsam and Jetsam: the Papers of Joseph Vendryes.

Thug an tOllamh Liam Breatnach an Léacht Poiblí Reachtúil a reáchtáladh i gcomhar leis an Tionól i gColáiste na hOllscoile, Baile Átha Cliath ar a Aoine an 14ú Samhain, faoin teideal 'The Church in the Laws of Early Mediaeval Ireland'. Bhí freastal an-mhaith ar an léacht seo, agus tá taifead den léacht seo ar fáil anois ar shuíomh gréasáin na Scoile.

### COMHDHÁIL LAE IN ONÓIR DON OLLAMH FERGUS KELLY

Chun scor an Ollaimh Kelly agus an sár-obair a rinne sé ar léann sean-dlíthe na hÉireann a chomórath, d'eagraigh an Stiúrthóir an tOllamh Liam Breatnach comhdháil speisialta san Institiúid ar an Satharn an 28ú Meitheamh. Mhair gach seisiún 45 nóiméad, agus tugadh na léachtaí seo leanas:

Thomas Charles-Edwards [Ollscoil Oxford]: '*Bretha Comaithchesa and Early Irish Farming*'.

Fangzhe Qiu [Coláiste na hOllscoile, Corcaigh]: 'The traditionalisation of early Irish law'.

Neil McLeod [Ollscoil Murdoch, An Astráil]: 'Removal on Sick-Maintenance: when did it cease?'.

Paul Russell [Ollscoil Cambridge]: 'Welsh and Latin in medieval Welsh law'.

Morfydd Owen [Canolfan Uwchefrydiau Cymreig a Cheltaidd, Aberystwyth]: 'Medieval Welsh cows, calves, bulls and oxen'.

Liam Breatnach [Institiúid Ard-Léinn Bhaile Átha Cliath]: 'The law of the church in *Bretha Nemed Toísech*'.

Huw Pryce [Ollscoil Bangor]: 'Nineteenth-century receptions of medieval Welsh law'.

Jaqueline Bemmer [Ollscoil Oxford]: 'Nuances of immunity and permitted violence: interpreting quotations with glosses and commentary from the *cairde*-text'.

### GRAMADACH AGUS PROSÓID NA GAEILGE: ONE DAY CONFERENCE ON THE MEDIEVAL AND EARLY MODERN IRISH GRAMMATICAL AND METRICAL TRADITION

Ba é seo an téama a bhí le comhdháil lae ar éirigh go hiontach leis ar an 26ú Meán Fómhair, a rinne an Dr Gordon Ó Riain a reachtáil.



## School of Celtic Studies (continued)

Fangzhe Qiu (University College Cork): 'The traditionalisation of early Irish law'.

Neil McLeod (Murdoch University, Australia): 'Removal on Sick-Maintenance: when did it cease?'.

Paul Russell (University of Cambridge): 'Welsh and Latin in medieval Welsh law'.

Morfydd Owen (Centre for Advanced Welsh and Celtic Studies, Aberystwyth): 'Medieval Welsh cows, calves, bulls and oxen'.

Liam Breatnach (Dublin Institute for Advanced Studies): 'The law of the church in *Bretha Nemed Toísech*'.

Huw Pryce (University of Bangor): 'Nineteenth-century receptions of medieval Welsh law'.

Jaqueline Bemmer (University of Oxford): 'Nuances of immunity and permitted violence: interpreting quotations with glosses and commentary from the *cairde*-text'.

### GRAMADACH AGUS PROSÓID NA GAELIGE: ONE DAY CONFERENCE ON THE MEDIEVAL AND EARLY MODERN IRISH GRAMMATICAL AND METRICAL TRADITION

This was the theme of a very successful conference organised by Dr Gordon Ó Riain and held at the Institute on 26 September.

The following papers were delivered (in order of presentation):

Liam Breatnach, 'The *Trefocal* tract'; Deborah Hayden, 'On grammatical questions in an unpublished fragment of *Auraicept na nÉces*'; Roisin McLaughlin, 'Unusual *gnáthaisti* in Mittelirische Verslehren III'; Pádraig Ó Macháin, 'Grammar, prosody and the written text'; Gordon Ó Riain, 'A fragment of an early modern grammatical and metrical tract'; Eoin Mac Cárthaigh, 'Comhthéacsanna *IGT* I'; Damian McManus, 'Fault-finding in *IGT*'; Ailbhe Ó Corráin, '*Rudimenta Grammaticae Hibernicae* by Giolla Brighde [alias Bonaventura] Ó hEódhusa'; Caoimhín Breatnach, 'The manuscript sources of *Rudimenta Grammaticae Hibernicae*'; Pádraig A. Breatnach, 'Ornamentation in *rannaigheacht*'.

### SUMMER SCHOOL

The Summer School this year was again a great success with almost 70 persons in attendance from all over the world. It took place from 14–26 July and the following courses were offered:

9.30 – 11.00	<b>1A. Modern Irish:</b> Dr Malachy McKenna
	<b>1B. Middle Welsh:</b> Dr Barry Lewis
11.30 – 13.00	<b>2A. Old Irish (introductory):</b> Professor Patricia Kelly.
	<b>2B. Old Irish (advanced):</b> Professor Liam Breatnach.
14.30 – 15.30	<b>3. Early Modern Irish:</b> Dr Gordon Ó Riain
16.00 – 17.00	<b>4A. Early Irish Law and Society.</b> [Week 1] Professor Fergus Kelly.
	<b>4B. Mediaeval Irish Manuscripts.</b> [Week 2] Dr Aoibheann Nic Dhonncha.

### SEMINARS AND LECTURES

Liam Breatnach completed a seminar on texts relating to satire, and began reading a set of previously unedited Early Irish Monastic Rules.

Pádraig Breatnach gave seminars on 'Some seventeenth- and eighteenth-century inedita' (February–April) and 'Materials for the study of ornamentation in *rannaigheacht*' (October–November).

Papers and lectures were delivered by staff at national and international conferences and venues as follows: [Liam Breatnach] 'Gnéithe den bhforainm sa Mheán-Ghaeilge', UCD, 28 March; 'The *Trefocal* tract', DIAS 26 September; 'Legal aspects of The Poems of Blathmac', at the Sixteenth Irish Texts Society Annual Seminar, UCC, Saturday November 8th; 'Fíngen Mac Flainn's poem to the Fir Arddae: an Early Medieval Irish threat of satire', Postgraduate Seminar, Dept. of Early Irish, Maynooth University, 20 November. [Pádraig Breatnach] 'Ornamentation in *rannaigheacht*' DIAS 26 September. [Fergus Kelly] 'Early Irish Music: the documentary evidence', The Pipers' Club, Henrietta Street, Dublin 1, 21 February; 'Brehon law meets Anglo-Norman law: a 13th-century law-tract by Giolla na Naomh Mac Aodhagáin', Conference on Brehon Law Past and Present, Department of Law, National University of Ireland, Maynooth, 9 April; 'Cattle in ancient Ireland: early Irish legal aspects', Conference on Beef, Bulls, Butchers and Biodiversity, Birr, Co. Offaly, organised by Agricultural History Society of Ireland, 14 June; 'Early Irish law and society', School of Celtic Studies Summer School (six lectures), 14–19 July. [Barry Lewis] 'Approaching the genealogies of the Welsh saints', Tionól, 15 November. [Aoibheann Nic Dhonnchadha] 'Medical writing in Early Modern Irish, 1350–1650', Research

## Scoil an Lín Cheiltigh [ar leanúint]

Tugadh na páipéir seo leanas (san ord inar cuireadh i láthair iad):

Liam Breatnach, 'The *Trefocal* tract'; Deborah Hayden, 'On grammatical questions in an unpublished fragment of *Auraicept na nÉces*'; Roisin McLaughlin, 'Unusual *gnáthaisti* in Mittelirische Verslehren III'; Pádraig Ó Macháin, 'Grammar, prosody and the written text'; Gordon Ó Riain, 'A fragment of an early modern grammatical and metrical tract'; Eoin Mac Cárthaigh, 'Comhthéacsanna IGT I'; Damian McManus, 'Fault-finding in IGT'; Ailbhe Ó Corráin, '*Rudimenta Grammaticae Hibernicae* by Giolla Brighde [alias Bonaventura] Ó hEódhusa'; Caoimhín Breatnach, 'The manuscript sources of *Rudimenta Grammaticae Hibernicae*'; Pádraig A. Breatnach, 'Ornamentation in *rannaigheacht*'.

### SCOIL SAMHRAIDH

D'éirigh go breá leis an Scoil Samhraidh i mbliana, le beagnach 70 duine ag freastal ó gach aird den domhan. Lean an Scoil ón 14–26 Iúil agus cuireadh na cúrsaí seo leanas ar fáil:

9.30 – 11.00	<b>1A. Modern Irish:</b> Dr Malachy McKenna
	<b>1B. Middle Welsh:</b> Dr Barry Lewis
11.30 – 13.00	<b>2A. Old Irish (introductory):</b> Professor Patricia Kelly.
	<b>2B. Old Irish (advanced):</b> Professor Liam Breatnach.
14.30 – 15.30	<b>3. Early Modern Irish:</b> Dr Gordon Ó Riain
16.00 – 17.00	<b>4A. Early Irish Law and Society.</b> [Week 1] Professor Fergus Kelly.
	<b>4B. Mediaeval Irish Manuscripts.</b> [Week 2] Dr Aoibheann Nic Dhonncha.

### SEIMINEÁIR AGUS LÉACHTAÍ

Chríochnaigh Liam Breatnach seimineár ar théacsanna faoin aoir, agus thosnaigh ar roinnt Rialacha Mainistreach luatha nár cuireadh in eagar cheana a léamh.

Reachtáil Pádraig Breatnach seimineár ar 'Some seventeenth- and eighteenth-century inedita' (Feabhra–Aibreán) agus ceann ar 'Materials for the study of ornamentation in *rannaigheacht*' (Deireadh Fómhair–Samhain).

Chuir baill foirne páipéir agus léachtaí i láthair ag comhdhála agus ag ionaid náisiúnta agus idirnáisiúnta mar seo a leanas: [Liam Breatnach] 'Gnéithe den bhforainm sa Mheán-Ghaeilge', COBÁC, 28 Márta; 'The *Trefocal* tract',

DIAS 26 Meán Fómhair; 'Legal aspects of The Poems of Blathmac', ag an 16ú seimineár bliantúil de Chumann na Sgríbhneann nGaeidhíle, Coláiste na hOllscoil, Corcaigh, 8 Samhain; 'Fíngen Mac Flainn's poem to the Fir Arddae: an Early Medieval Irish threat of satire', Seimineár Iarchéime, Roinn na Sean-Ghaeilge, Ollscoil Mhá Nuad, 20 Samhain. [Pádraig Breatnach] 'Ornamentation in *rannaigheacht*' DIAS 26 Meán Fómhair. [Fergus Kelly] 'Early Irish Music: the documentary evidence', Na Píobairí Uilleann, Sráid Henrietta, Baile Átha Cliath 1, 21 Feabhra; 'Brehon law meets Anglo-Norman law: a 13th-century law-tract by Giolla na Naomh Mac Aodhagáin', Comhdháil ar Dhlithe na mBreithiún, Roinn an Dlí, Ollscoil Mhá Nuad, 9 Aibreán; 'Cattle in ancient Ireland: early Irish legal aspects', Comhdháil ar 'Beef, Bulls, Butchers and Biodiversity', Biorra, Co. Ua bhFáilí, a d'eagair Cumann Stair Thalmhaíocht na hÉireann, 14 Meitheamh; 'Early Irish law and society', Scoil Samhraidh, Scoil an Léinn Cheiltigh [sé léacht], 14–19 Iúil. [Barry Lewis] 'Approaching the genealogies of the Welsh saints', Tionól, 15 Samhain. [Aoibheann Nic Dhonnchadha] 'Medical writing in Early Modern Irish, 1350–1650', Seimineár Taighde, Dept. of Anglo-Saxon, Norse, and Celtic, Ollscoil Cambridge, 3 Márta; 'The Irish-speaking area of Co. Waterford: its cultural and linguistic heritage', Seimineár Nua-Ghaeilge, Dept. of Anglo-Saxon, Norse, and Celtic, Ollscoil Cambridge, 4 Márta; 'Medical writing in Irish, 1350 to 1650', Acadamh Ríoga an Leighis in Éirinn, Roinn Stair an Leighis, 16 Aibreán; 'Celebrating 600 years: Maynooth's earliest Irish manuscript', Comhdháil ar 'Charms and Magic in Medieval and Modern Ireland 2', Roinn na Sean-Ghaeilge, Ollscoil Mhá Nuad, 6 Meitheamh. [Brian Ó Curnáin] "'Cé as aniar thú agus cé leis ansin thú?" Canúineolaíocht Chonamara', Acadamh na hOllscolaíochta Gaeilge, An Cheathrú Rua, Co. na Gaillimhe, 30 Meitheamh; 'Iniúchadh ar an gcumas dátheangach', seimineár Oideachas Gaeltachta – cá bhfuil ár dtíall? in Óstán Wynn, Baile Átha Cliath, 20 Samhain. [Gordon Ó Riain] 'A fragment of an early modern grammatical and metrical tract', DIAS 26 Meán Fómhair; Cúrsa ar an Nua-Ghaeilge Mhoch ag an Scoil Samhraidh. [Deborah Hayden] 'Observations on the "doors of death" in a medieval Irish medical catechism', Cruinniú Bliantúil den Celtic Studies Association of North America, Roanoke, Virginia, USA, Márta; 'Scholarly networks and information in medieval Ireland: the evidence of legal manuscripts', 14th Conference of the International Society for the Study of European Ideas, Porto, An Phortaingéil, Lúnasa [cainteoir le cuireadh]; 'On Grammatical questions in an unpublished fragment of *Auraicept na nÉces*', DIAS 26 Meán Fómhair [cainteoir le cuireadh]. [Síle Ní Mhurchú] 'Poetic contention in *Agallamh Oisín agus Phádraig*' at Fíanaigecht: The Second International Finn Cycle Conference, Ollscoil Glaschú, 11 Lúnasa; 'Briathra Buile agus Comhrá Cliste: Gnéithe d'*Agallamh Oisín agus Phádraig*' at Comhdháil ar



Seminar, Dept. of Anglo-Saxon, Norse, and Celtic, University of Cambridge, 3 March; 'The Irish-speaking area of Co. Waterford: its cultural and linguistic heritage', Modern Irish Seminar, Dept. of Anglo-Saxon, Norse, and Celtic, University of Cambridge, 4 March; 'Medical writing in Irish, 1350 to 1650', Royal Academy of Medicine in Ireland: History of Medicine Section, 16 April; 'Celebrating 600 years: Maynooth's earliest Irish manuscript', Conference: 'Charms and Magic in Medieval and Modern Ireland 2', Dept. of Early Irish, NUI Maynooth, 6 June. [Brian Ó Curnáin] "'Cé as aniar thú agus cé leis ansin thú?" Canúineolaíocht Chonamara', Acadamh na hOllscolaíochta Gaeilge, An Cheathrú Rua, Co. na Gaillimhe, 30th June; 'Iniúchadh ar an gcumas dátheangach', seimineár Oideachas Gaeltachta - cá bhfuil ár dtriall? Wynn's Hotel, Dublin, 20th November. [Gordon Ó Riain] 'A fragment of an early modern grammatical and metrical tract', DIAS, 26th September; Course on Early Modern Irish at Summer School. [Deborah Hayden] 'Observations on the "doors of death" in a medieval Irish medical catechism', Celtic Studies Association of North America Annual Meeting, Roanoke, Virginia, USA, March; 'Scholarly networks and information in medieval Ireland: the evidence of legal manuscripts', 14th Conference of the International Society for the Study of European Ideas, Porto, Portugal, August [invited speaker]; 'On Grammatical questions in an unpublished fragment of Auraicept na nÉces', DIAS, September [invited speaker]. [Síle Ní Mhurchú] 'Poetic contention in *Agallamh Oisín agus Phádraig*' at Fíanaigecht: The Second International Finn Cycle Conference, University of Glasgow, 11 August; 'Briathra Buile agus Comhrá Cliste: Gnéithe d'*Agallamh Oisín agus Phádraig*' at Comhdháil ar Litríocht agus ar Chultúr na Gaeilge, NUI Galway, 11 October [invited plenary lecture]. [Nicole Volmering] 'The rhetoric of catastrophe in 11th century medieval Ireland: the case of The Second Vision of Adomnán', 20th Annual ACMRS Interdisciplinary Conference, Scottsdale AZ, February 6-8; 'Journeys to the Afterworld: "Apocalypse" or "Vision"?', International Symposium On Christian Apocryphal Literature, Thessaloniki, June 26-29; 'Visions, immrama and the Interim', Session 302 Highway to Hell, Leeds International Medieval Congress, July 7-10. She also gave tutorials in Old Irish for one hour per week in the Autumn Semester, Maynooth University. [Mícheál Hoyne] 'A survey of *brúilingeachd* verse', Tionól.

### EDITING

Liam Breatnach was co-editor with D. Mc Manus of *Ériu* volume 64.

Pádraig Breatnach, Barry Lewis and Fergus Kelly worked as co-editors on *Celtica* 28.

Fergus Kelly was also internal editor of Elizabeth Boyle and Deborah Hayden (eds), *Authorities and Adaptations: The Reworking and Transmission of Sources in Medieval Ireland*.

Aoibheann Nic Dhonnchadha continued editorship, in association with Prof. Pádraig Ó Macháin, of *An Linn Bhui: Iris Ghaeltacht na nDéise*, volume 18 being published in 2014.

Deborah Hayden completed work on *Authorities and Adaptations: The Reworking and Transmission of Textual Sources in Medieval Ireland*, ed. by Elizabeth Boyle and Deborah Hayden [Dublin: DIAS, 2014], and continued work on *Grammar and Grammarians in Medieval Ireland and Wales*, ed. by Deborah Hayden and Paul Russell [forthcoming in the Studies in the History of the Languages Sciences Series, John Benjamins].

Nicole Volmering was a member of the editorial board for *Aigne* 6.

### EXTERNAL EXAMINING AND MEMBERSHIP OF COMMITTEES

Fergus Kelly was external examiner for the Department of Early and Medieval Irish, University College, Cork [2013-14], and for the Department of Old and Middle Irish and Celtic Philology, National University of Ireland, Galway [25 March]. He acted as mentor for a PhD thesis and a Post-doctoral Fellowship at the School of Archaeology, University College, Dublin. He was Chairman of the Publications Committee (until 11 June), a member of the Advisory Panel of Ogham in 3D Project, and a committee member of the Agricultural History Society of Ireland.

Barry Lewis was a member of the Advisory Board for the Cult of Saints in Wales Project and of the Editorial Board of the Poets of the Nobility Series [both for University of Wales Centre for Advanced Welsh and Celtic Studies].

Aoibheann Nic Dhonnchadha was a member of An Fochoiste Leabharlainne, Coláiste na Rinne, and of the editorial board of CELT. Brian Ó Curnáin was a member of the advisory committee of *Taighde*.

Gordon Ó Riain was a member of the International Advisory Board for project based at University of Connecticut, 'Reading Early Modern Irish: a digital guide to Irish Gaelic [c. 1200-1650]', and a member of the advisory board of the First Poznań conference of Celtic Studies, 18-19 October 2014.

Litríocht agus ar Chultúr na Gaeilge, ONÉ Gaillimh, 11 Deireadh Fómhair 2014 [cainteoir le cuireadh]. [Nicole Volmering] 'The rhetoric of catastrophe in 11th century medieval Ireland: the case of The Second Vision of Adomnán', 20th Annual ACMRS Interdisciplinary Conference, Scottsdale AZ, Feabhra 6-8; 'Journeys to the Afterworld: "Apocalypse" or "Vision"?', International Symposium On Christian Apocryphal Literature, Thessaloniki, Meitheamh 26-29; 'Visions, immrama and the Interim', Session 302 Highway to Hell, Leeds International Medieval Congress, Iúil 7-10. Thug sí ranganna teagaisc Sean-Ghaeilge, 1 uair in aghaidh na seachtaine, i Seimeastar an Fómhair in Ollscoil Mhá Nuad. [Micheál Hoyne] 'A survey of brúilingeachd verse', Tionól 2014.

### EAGARTHÓIREACHT

Bhí Liam Breatnach ina chomheagarthóir le D. Mc Manus ar *Ériu* imleabhar 64.

D'oibrigh Pádraig Breatnach, Barry Lewis agus Fergus Kelly mar chomheagarthóirí ar ar *Celtica* 28.

Bhí Fergus Kelly ina eagarthóir inmheánach chomh maith ar Elizabeth Boyle agus Deborah Hayden (eag.), *Authorities and Adaptations: The Reworking and Transmission of Sources in Medieval Ireland*.

Lean Aoibheann Nic Dhonnchadha mar eagarthóir, i gcomhar leis an Ollamh Pádraig Ó Macháin, ar *An Linn Bhuí: Iris Ghaeltacht na nDéise*, agus foilsíodh imleabhar 18 in 2014.

Chríochnaigh Deborah Hayden obair ar *Authorities and Adaptations: The Reworking and Transmission of Textual Sources in Medieval Ireland*, in eagar ag Elizabeth Boyle agus Deborah Hayden (DIAS, 2014), and lean sí le hobair ar *Grammar and Grammarians in Medieval Ireland and Wales*, in eagar ag Deborah Hayden agus Paul Russell (le foilsiú sa sraith Studies in the History of the Languages Sciences Series, John Benjamins).

Bhí Nicole Volmering ina ball den bhord eagarthóireachta do *Aigne* 6.

### SCRÚDÚCHÁN SEACHTRACH AGUS BALLRÁIOCHT CHOISTÍ

Bhí Fergus Kelly ina scrúdaitheoir seachtrach do Roinn na Luath-Ghaeilge agus na Gaeilge Meánaoisí, Coláiste na hOllscoile, Corcaigh 2013-14, agus do Roinn na Sean-Ghaeilge agus na Meán-Ghaeilge, Ollscoil Náisiúnta na hÉireann, Gaillimh. Bhí sé ina mheántóir ar thráchtas PhD agus ar Chomhaltacht lardhochtúireachta ag Scoil na Seandálaíochta, Coláiste na hOllscoile, Baile Átha Cliath. Bhí sé ina Chathaoirleach ar Choiste na bhFoilseachán [go dtí 11

Meitheamh], ina bhall de Choiste Comhairle don tionscnamh Ogham in 3D, agus ina bhall de choiste Chumann Stair Thalmhaíocht na hÉireann.

Bhí Barry Lewis ina bhall den Bhord Comhairleach don tionscnamh 'Cult of Saints in Wales' agus ina bhall den Bhord Eagarthóireachta don sraith Poets of the Nobility [araon don Lárionad Ard-Léinn sa Bhreatnais agus an Léann Ceilteach, Ollscoil na Breataine Bige].

Bhí Aoibheann Nic Dhonnchadha ina ball den Fhochoiste Leabharlainne, Coláiste na Rinne, agus de bhord eagarthóireachta CELT.

Bhí Brian Ó Curnáin ina bhall den choiste comhairleach do *Taighde*.

Bhí Gordon Ó Riain ina bhall den Choiste Comhairleach Idirnáisiúnta do thionscnamh bunaithe in Ollscoil Connecticut, 'Reading Early Modern Irish: a digital guide to Irish Gaelic [c. 1200-1650]', agus ina bhall de bhord comhairleach an Chéad Chomhdháil um Léann Ceilteach in Poznań, 18-19 Deireadh Fómhair 2014.

Bhí Deborah Hayden ina scrúdaitheoir do Roinn na Ceiltise in Ollscoil Oxford. Chomh maith leis sin bhí sí ina Cisteoir agus ina Rúnaí Ballraíochta den Henry Sweet Society for the History of Linguistic Ideas [www.henrysweet.org], agus ina ball den bhord eagarthóireachta don *Journal of Celtic Linguistics*.

Bhí Síle Ní Mhurchú ina ball den choiste eagraíochta do Fánaigeacht: The Second International Finn Cycle Conference, a reachtáladh in Ollscoil Glaschú, 11-12 Lúnasa 2014.

### FOILSEACHÁIN

Liam Breatnach: 'Forms of payment in the early Irish law tracts', *Cambrian Medieval Celtic Studies* 68 [Winter 2014] 1-20.

'Varia I. 1. *De Duodecim Abusivis Saeculi* in mediaeval Ireland. 2. *ané, aná* and an example in Bardic Syntactical Tracts', *Ériu* 64 [2014] 205-11.

Fergus Kelly: le foilsiú: 'Cattle in ancient Ireland: early Irish legal aspects', in *Cattle in ancient and modern Ireland* [ed. Michael O'Connell]

'Vocalic music in medieval Ireland', in *Essays on Irish Song* [ed. Ann Buckley, Conor Caldwell, Moyra Haslett]

Barry Lewis: 'St Mechyll of Anglesey, St Maughold of Man and St Malo of Brittany', *Studia Celtica Fennica* 9 [2014] 24-38.

Deborah Hayden served as an examiner for the Department of Celtic at the University of Oxford. She was also Treasurer and Membership Secretary of the Henry Sweet Society for the History of Linguistic Ideas ([www.henrysweet.org](http://www.henrysweet.org)), and a member of the editorial board of the *Journal of Celtic Linguistics*.

Síle Ní Mhurchú was a member of the organizing committee for Fíanaigeacht: The Second International Finn Cycle Conference, held at the University of Glasgow, 11-12 August 2014.

### PUBLICATIONS

Liam Breatnach: 'Forms of payment in the Early Irish law tracts', *Cambrian Medieval Celtic Studies* 68 (Winter 2014) 1-20.

'Varia I. 1. *De Duodecim Abusivis Saeculi* in Mediaeval Ireland. 2. *ané, aná* and an example in Bardic Syntactical Tracts', *Ériu* 64 (2014) 205-11.

Fergus Kelly: Accepted for publication:

'Cattle in ancient Ireland: early Irish legal aspects', in *Cattle in ancient and modern Ireland* [ed. Michael O'Connell]

'Vocalic music in medieval Ireland', in *Essays on Irish Song* [ed. Ann Buckley, Conor Caldwell, Moyra Haslett]

Barry Lewis: 'St Mechyll of Anglesey, St Maughold of Man and St Malo of Brittany', *Studia Celtica Fennica* 9 (2014) 24-38.

Brian Ó Curnáin [with Tamás Péterváry, Conchúr Ó Giollagáin, Jerome Sheahan], *Iniúchadh ar an gcumas dátheangach; an sealbhú teanga i measc ghlúin óg na Gaeltachta. Analysis of bilingual competence; language acquisition among young people in the Gaeltacht*. Dublin: An Chomhairle um Oideachas Gaeltachta & Gaelscolaíochta. Accepted for publication in *Éigse*: 'Cróineolaíocht na Gaeilge iarthraidisiúnta i gConamara, 1950-2004'. 'Cúig phaidir as an gCaisleán Gearr agus Eanách Dhúin'. 'Amhrán faoin bportach as Carna'.

Gordon Ó Riain [Forthcoming]: 'Táinig an tráth nóna: old age in Classical Irish religious verse' in C. Breatnach & M. Ní Úrdail (eds), *Aon Don Éigse. Essays Marking Osborn Bergin's Centenary Lecture on Bardic Poetry* [1912].

Deborah Hayden: 'Anatomical metaphor in *Auraicept na nÉces*', in *Authorities and adaptations: The reworking and transmission of textual sources in medieval Ireland*, ed. by Elizabeth Boyle and Deborah Hayden [Dublin: DIAS, 2014] 23-61. [with Elizabeth Boyle]: 'Introduction: Authority and adaptation in medieval Ireland', in *Authorities and adaptations: The reworking and transmission of textual sources in medieval Ireland*, ed. by Elizabeth Boyle and Deborah Hayden [Dublin: DIAS, 2014] xvii-xlvii.

'On the meaning of two Medieval Irish medical terms: *derg dásachtach* and *rúad (fh)rasach*', *Ériu* 64 (2014) 1-21.

Review of Dónall Ó Baoill, Donncha Ó hAodha and Nollaig Ó Muraíle, eds [2013], *Saltair saíochta, sanasaíochta agus seanchais: a festschrift for Gearóid Mac Eoin* [Dublin: Four Courts Press], in Celtic Studies Association of North America Newsletter, Samhain 2014, 12-16.

Síle Ní Mhurchú: 'An tAgallamh Nua: athleagan déanach d'Agallamh na Seanórach' in *In dialogue with the Agallamh: essays in honour of Seán Ó Coileáin*, Aidan Doyle and Kevin Murray (eds), Dublin: Four Courts Press, 2014 185-217.

Review of 'Súil siar ar Canfar an Dán: Uilliam English agus a chairde, in eagar ag Úna Nic Éinrí', *Feasta*, May 2014, 11-13.

[Forthcoming]: 'An Ghaeilge faoi chló is faoi chaibidil sa naoú céad déag: Bláithfhleasg na Milseán', *Tipperary Historical Journal*, 2015.

Review of *Téanam go Min Aird: Stairsheanchas Lís Ní Shúilleabháin* edited by Roibeard Ó Cathasaigh, to appear in *Béascna/UCC Journal of Folklore and Ethnology*, Vol. 9 (2014).

Nicole Volmering: 'The Second Vision of Adomnán', in *The End and Beyond: Medieval Irish Eschatology*, ed. John Carey, Emma Nic Cárthaigh, and Caitríona Ó Dochartaigh [Aberystwyth: Celtic Studies Publications, 2014] 647-81.

'The Old English account of the seven Heavens', *ibid.* 285-306.

'Bibliography of Medieval Irish eschatology and related sources', *ibid.* 856-912.

Fangzhe Qiu: *Dear Old Ireland/ Qinai de Lao Airelan* [in Chinese], Shanghai: Shanghai Joint Publishing Company, 2014. [submitted]: 'The Ulster Cycle in the law tracts', for publication in *Ulidia* 4. Proceedings of the 2013 Ulster Cycle Conference.

Brian Ó Curnáin [le Tamás Péterváry, Conchúr Ó Giollagáin, Jerome Sheahan], *Iniúchadh ar an gcumas dátheangach; an sealbhú teanga i measc ghlúin óg na Gaeltachta. Analysis of bilingual competence; language acquisition among young people in the Gaeltacht*. Baile Átha Cliath: An Chomhairle um Oideachas Gaeltachta & Gaelscolaíochta. Le foilsiú in Éigse: 'Cróineolaíocht na Gaeilge iarthraidisiúnta i gConamara, 1950-2004'. 'Cúig phaidir as an gCaisleán Gearr agus Eanach Dhúin'. 'Amhrán faoin bportach as Carna'.

Gordon Ó Riain [le teacht]: 'Táinig an tráth nóna: old age in Classical Irish religious verse' in C. Breatnach & M. Ní Úrdail (eds), *Aon Don Éigse. Essays Marking Osborn Bergin's Centenary Lecture on Bardic Poetry* [1912].

Deborah Hayden: 'Anatomical metaphor in *Auraicept na nÉces*', in *Authorities and adaptations: The reworking and transmission of textual sources in medieval Ireland*, ed. by Elizabeth Boyle and Deborah Hayden [Dublin: DIAS, 2014] 23-61.

[le Elizabeth Boyle]: 'Introduction: Authority and adaptation in medieval Ireland', in *Authorities and adaptations: The reworking and transmission of textual sources in medieval Ireland*, ed. by Elizabeth Boyle and Deborah Hayden [Dublin: DIAS, 2014] xvii-xlvii.

'On the meaning of two medieval Irish medical terms: *derg dásachtach* and *rúad [fh]rasach*', *Ériu* 64 [2014] 1-21.

Léirmheas ar Dónall Ó Baoill, Donncha Ó hAodha and Nollaig Ó Muraile, eds [2013], *Saltair saíochta, sanasaíochta agus seanchais: a festschrift for Gearóid Mac Eoin* [Dublin: Four Courts Press], in Celtic Studies Association of North America Newsletter, Samhain 2014, 12-16.

Síle Ní Mhurchú: 'An tAgallamh Nua: athleagan déanach d'Agallamh na Seanórach' in *In dialogue with the Agallamh: essays in honour of Seán Ó Coileáin*, Aidan Doyle and Kevin Murray (eds), Dublin: Four Courts Press, 2014 185-217.

Léirmheas ar 'Súil siar ar Canfar an Dán: Uilliam English agus a chairde, in eagar ag Una Nic Éinrí', *Feasta*, May 2014, 11-13.

[le foilsiú]: 'An Ghaeilge faoi chló is faoi chaibidil sa naoú céad déag: Bláithfhleasg na Milseán', *Tipperary Historical Journal*, 2015.

Léirmheas ar *Téanam go Min Aird: Stairsheanchas Lís Ní Shúilleabháin* edited by Roibeard Ó Cathasaigh, to appear in *Béascna/UCC Journal of Folklore and Ethnology*, Vol. 9 [2014].

Nicole Volmering: 'The Second Vision of Adomnán', in *The End and Beyond: Medieval Irish Eschatology*, ed. John Carey, Emma Nic Cárthaigh, and Caitríona Ó Dochartaigh [Aberystwyth: Celtic Studies Publications, 2014] 647-81.

'The Old English account of the seven Heavens', *ibid.* 285-306.

'Bibliography of medieval Irish eschatology and related sources', *ibid.* 856-912.

Fangzhe Qiu: *Dear Old Ireland/ Qinai de Lao Airelan* [in Chinese], Shanghai: Shanghai Joint Publishing Company, 2014. [faoi bhráid eagarthóireachta]: 'The Ulster Cycle in the law tracts', le haghaidh *Ulidia* 4. Proceedings of the 2013 Ulster Cycle Conference.

# School of Cosmic Physics

Among the scientific highlights of School's research during the year were the suggestion that the high-energy neutrinos recently detected by the Ice Cube experiment may be related to the mysterious "Fermi bubbles" and an extended Galactic halo, observations of dust evolution and planet formation in young stellar systems, improved global seismic tomography applied to regional models, and work on the potential for geothermal energy in Ireland. Full details of the work of the School can be found in the detailed sectional reports available on the DIAS website. In addition the year was marked by two major administrative events. The first was the quinquennial international peer review which took place over three days from 10 to 12 June [every School in DIAS is reviewed every five years]. The second was the search for a new Senior Professor to succeed Prof Alan Jones who announced his intention to retire at the end of the year.

The International review commissioned by the Council of the Institute was conducted by a panel chaired by Professor Brian Kennett from the Australian National University. The other members were Professors Jim Pringle [University of Cambridge], Andrew King [University of Leicester], Andreas Junge [University of Frankfurt], and Eoin O'Reilly [Tyndall National Institute, Cork]. The Review Committee received a comprehensive briefing package including submissions from each of the Sections, Annual Research Reports, and other background documents. Site visits were made to each Section and the Committee had the opportunity to speak with almost all members of the School from senior academics to scholars and technical staff.

While noting the considerable research, training and outreach successes of the School during a very difficult five year period the report endorsed the urgent need for succession planning and rejuvenation. This is particularly necessary with the imminent retirements of senior staff members and will help to reverse the negative impact of the recent economic crisis. The panel recommended the filling of the Senior Professorship in Geophysics as soon as possible following the retirement of Professor Jones and emphasised that this should be on an open basis and without any fettered resources. In the case of Astronomy and Astrophysics, the report noted the severe impact of the employment control framework on the number of Schroedinger Fellowships, an effect compounded by the prioritisation of national funding under the strategy

for science, technology and innovation towards areas seen as economically relevant and the consequent loss of externally funded postdoctoral positions. The panel recommended a carefully planned rejuvenation of astrophysics via targeted and staged appointments over the next few years. This should aim at establishing a well-focussed research group working in a carefully chosen topical area. It noted the utility of Schroedinger fellowships for this purpose and recommended the appointment of two new fellows. The panel further noted that membership of the European Southern Observatory is critical to sustaining the status of astronomy in Ireland and considered that this must remain a key strategic objective of the School.

Following the advice of the international review the Governing Board of the School launched a process to identify an outstanding geophysicist to succeed Professor Jones.



---

*Professor Chris Bean*

---

*An tOllamh Chris Bean*

---



# Scoil na Fisice Cosmaí

I measc buaicphointí thaighde eolaíochta na Scoile i rith na bliana bhí an tuairim go mb'fhéidir go bhfuil na neoidrionónna ardfhuinnimh a aimsíodh le déanaí ag an turgnamh Ice Cube gaolta leis na "bolgóidí Fermi" rúndiamhracha agus luan Réaltrach sínithe, breathnuithe ar éabhlóid deannaigh agus foirmiú pláinéid i gcórais réaltacha óga, tomagrafaíocht sheismeach dhomhanda fheabhsaithe curtha i bhfeidhm ar shamhlacha réigiúnacha, agus obair ar an bhféidearthacht don fhuinneamh geoiteirmeach in Éirinn. Is féidir sonraí iomlána ar obair na Scoile a fháil ar na tuairiscí rannóige mionsonracha atá ar fáil ar shuíomh gréasáin DIAS. Ina theannta sin, bhí dhá mhór-ócáid riaracháin ann le linn na bliana. Ba é an chéad cheann an t-athbhreithniú píaraí idirnáisiúnta cúigbhliantúil a rinneadh thar trí lá ón 10 go 12 Meitheamh [déantar athbhreithniú ar gach Scoil i DIAS gach cúig bliana]. Bá é an dara ceann an cuardach d'Ollamh Sinsearach nua le teacht ionad an Ollaimh Alan Jones a d'fhógair go raibh sé ar intinn aige dul ar scor ag deireadh na bliana.

Cuireadh an t-athbhreithniú idirnáisiúnta a d'ordaigh Comhairle na hInstitiúide i gcrích ag painéal leis Ollamh Brian Kennett ó Ollscoil Náisiúnta na hAstráile ina chathaoirleach. B'iad seo a leanas na comhaltaí eile: na hOllúna Jim Pringle [Ollscoil Cambridge], Andrew King [Ollscoil Leicester], Andreas Junge [Ollscoil Frankfurt], agus Eoin O'Reilly [Institiúid Náisiúnta Tyndall, Corcaigh]. Tugadh pacáiste eolais cuimsitheach don Choiste Athbhreithnithe, lena n-áiríodh aighneachtaí ó gach ceann de na Rannóga, Tuairiscí Taighde Bliantúla, agus cáipéisí cúlra eile. Tugadh cuairteanna suímh ar gach Rannóg agus bhí an deis ag an gCoiste labhairt le comhaltaí uile na Scoile, geall leis, idir lucht acadúil sinsearach agus scoláirí agus foireann theicniúil.

Cé gur tugadh aitheantas do rathanna suntasacha na Scoile sa taighde, san oiliúint agus san fhor-rochtain le linn tréimhse cúig bliana a bhí an-deacair, thacaigh an tuarascáil leis an ngá práinneach atá le pleanáil comharbais agus athnuachan. Tá sé seo riachtanach ach go háirithe mar thoradh ar bhaill foirne shinsearacha ag dul ar scor go luath agus cuideoidh sé leis an tionchar diúltach a bhí ag an ngéarchéim eacnamaíochta le déanaí a iompú ar ais. Mhol an painéal go líonfaí an post mar Ollamh Sinsearach sa Gheoifisic a luaite agus is féidir i ndiaidh don Ollamh Jones dul ar scor agus dúirt go láidir gur chóir é seo a dhéanamh ar bhonn oscailte agus gan acmhainní srianta ar bith. I gcás na Réalteolaíochta agus na Réaltfhisice, luaigh an tuarascáil an tionchar tromchúiseach a bhí ag an gcreat rialaithe

fostaíochta ar líon na gComhaltachtaí Schroedinger, agus cuireadh treisiú leis an tionchar sin mar thoradh ar an tús áite a tugadh sa mhaoiniú náisiúnta, faoin straitéis don eolaíocht, teicneolaíocht agus nuálaíocht, do réimsí a fheictear a bheith ábhartha ó thaobh na heacnamaíochta de, agus cailleadh poist iardhochtúireachta le maoiniú seachtrach dá bharr. Mhol an painéal go mbeadh athbheochan a bheidh pleanáilte go cúramach ar an réaltfhisic ann trí cheapacháin spriocaimsithe agus chéimithe sna blianta beaga amach anseo. Ba chóir go ndíreofaí a leithéid ar ghrúpa taighde dea-dhírthe a bhunú, ag obair i réimse topaice a roghnófar go cúramach. Luaigh sé úsáideacht na gComhaltachtaí Schroedinger don chúis seo agus mhol sé go gceapfaí beirt chomhaltaí nua. Luaigh an painéal freisin go bhfuil ballraíocht sa Réadlann Eorpach sa Leathsféar Theas rithábachtach le stádas na réalteolaíochta in Éirinn a chaomhnú agus mheas siad nach mór go bhfanadh sé seo mar phríomh-chuspóir straitéiseach de chuid na Scoile.

Mar thoradh ar chomhairle an athbhreithnithe idirnáisiúnta, sheol Bord Rialaithe na Scoile próiseas chun sár-gheoifisiceoir a aithint le teacht i gcomharbacht ar an Ollamh Jones.

Bhí sé seo á riar ag coiste cuardaigh idirnáisiúnta ar a raibh na hOllúna Gerry Wrixon [Cathaoirleach an Bhoird], Luke Drury [Stiúrthóir na Scoile], Mary Fowler [Ollscoil Cambridge], John McCloskey [Ollscoil Uladh] agus Hans-Peter Bunge [Ollscoil Munich]. Thug an coiste tuairisc ar ais faoina thátail go dtí an Bord Rialaithe an 25 Meán Fómhair agus ar bhunús thuairisc an choiste d'aontaigh an Bord moladh a thabhairt don Aire Oideachais agus Scileanna go ndéanadh Uachtarán na hÉireann, ar chomhairle an Rialtais, an tOllamh Chris Bean a cheapadh ina Ollamh Sinsearach nua sa Gheoifisic.

Is cuí ag an bpointe seo aitheantas a thabhairt don chion a rinne an tOllamh Alan Jones le rannóg na Geoifisice agus leis an Scoil i rith a thréimhse i mBaile Átha Cliath. Leathnaigh sé obair na rannóige trí staidéar maighnéada-teallúrach, a réimse saineolais ar leith, a thabhairt isteach, rud atá úsáideach chun cuidiú leis na mór-mhodhanna geoifisice d'anailís sheismeach agus staidéar réimse féideartha a chothaigh sé freisin. D'éirigh leis maoiniú a fháil do Chlár Iarchéime Geo-eolaíochtaí na hÉireann, a chuir réimse de chúrsaí ar fáil do mhic léinn iarchéime ar fud an oileáin, agus i rith a thionachta freisin cuireadh an clár for-rochtana Seisméolaíochta sa Scoil i bhfeidhm chomh maith le comhar leis an Roinn Gnóthaí Eachtracha san Eagraíocht an Chonartha um Chosc Cuimsitheach ar Thrialacha Núicléacha.



## School of Cosmic Physics (continued)

This was run by an international search committee consisting of Professors Gerry Wrixon [Board Chairman], Luke Drury [Director of the School], Mary Fowler [University of Cambridge], John McCloskey [University of Ulster] and Hans-Peter Bunge [University of Munich]. The committee reported back on its findings to the Governing Board on the 25th September and on the basis of the committee's report the Board agreed to recommend to the Minister for Education and Skills that Professor Chris Bean be appointed by the President of Ireland on the advice of Government as the New Senior Professor in Geophysics.

It is appropriate at this point to note the contribution that Prof Alan Jones made to the Geophysics section and the School during his period in Dublin. He broadened the work of the section by introducing magneto-telluric studies, his own particular area of expertise, which provides a useful complement to the major geophysical methods of seismic analysis and potential field studies which he also fostered. He was successful in obtaining funding for the Irish Geosciences Graduate Programme, which offered a range of courses to graduate students across the island, and his tenure also saw the roll-out of the Seismology in Schools outreach programme as well as collaboration with the Department of Foreign Affairs in the Comprehensive Test-Ban Treaty Organisation. He devoted much of his considerable energy to building up the section's resources and championed a more metrics driven approach to the management of the School.

Turning to science, in Astrophysics it has become clear in the last few years that the Galactic centre is more complex and dynamic at high-energies than previously thought. The "Fermi bubbles" detected in gamma-rays by the Fermi satellite are a clear indication of this and point to a large and extended outflow of cosmic-rays and gas from the central regions of our Galaxy. Interestingly if our Galaxy does have a large extended halo filled with cosmic rays and tenuous gas, as these observations suggest, then Andrew Taylor and Felix Aharonian have shown that high-energy neutrinos will be produced at rates comparable to those recently seen by the IceCube experiment at the South pole.



*Professor Alan Jones*

---

### *An tOllamh Alan Jones*

---

As a result of recent improvements in observing facilities [notably the coming online of the Atacama Large Millimetre Array, ALMA, operated by the European Southern Observatory in Chile] the study of star formation has entered a very exciting phase where we are beginning to see planet formation as an integral part of star formation intimately connected to the evolution of dust in the proto-stellar disc and its outflows. Tom Ray was one of several authors who wrote a major review for Protostars and Planets on this topic and it will be a major focus of research with the James Webb Space Telescope where he is a co-PI on one of the European instruments.

In Geophysics the work by Segei Lebedev and his student Andrew Schaeffer on global tomographic models is attracting wide attention and was recognised with the award of the Inaugural Graduate Research Award by the American Geophysical Union's focus group on the Study of the Earth's Deep Interior. Their models reveal the structure of the Earth's upper mantle in unprecedented detail and as well as the global modelling, now form the basis for a series of regional investigations.

## Scoil na Fisice Cosmaí [ar leanúint]

Chaith sé cuid mhór dá fhuinneamh suntasach le tógáil acmhainní na rannóige agus chothaigh sé cur chuige bunaithe níos mó ar mhéadracht i leith bhainistíocht na Scoile.

Maidir leis an eolaíocht, sa Réaltfhisic is léir le blianta beaga anuas go bhfuil an luan Réaltrach níos casta agus níos dinimiciúla ag ardphuinnimh ná mar a ceapadh roimhe. Léiriú soiléir air seo is ea na "bolgoidí Fermi" a aimsíodh i ngáma-ghathanna ag an saillit Fermi, agus tugann siad le tuiscint go bhfuil eis-sreabhadh mór sínithe de ghathanna cosmacha agus gás ó réigiúin láir ár Réaltra. Rud atá suimiúil, má tá luan mór sínithe ag ár Réaltra líonta le gathanna cosmacha agus gás, mar a thugann na breathnuithe seo le tuiscint, ansin tá sé léirithe ag Andrew Taylor agus Felix Aharonian go dtáirgeofar neoidríonónna ardfhuinnimh ag rátaí ionchurtha leis na cinn a chonacthas le déanaí ag an turgnamh Ice Cube ag an Mol Theas.

Mar thoradh ar fheabhsúcháin le déanaí in áiseanna breathnaithe [ach go háirithe teacht ar líne Atacama Large Millimetre Array, ALMA, atá á fheidhmiú ag an Réadlann Eorpach sa Leathsféar Theas sa tSile] tá an staidéar ar fhoirmiú réalta tagtha chuig céim an-spreagúil ar fad ina bhfeicimid foirmiú pláinéid mar chuid dhúchasach d'fhoirmiú réalta sa diosca atá nasctha go dlúth le héabhlóid deannaigh sa diosca próta-réaltach agus a eis-sreafaí. Bhí Tom Ray ar dhuine de roinnt údar a scríobh léirmheas tábhachtach do Protostars and Planets ar an topaic seo agus beidh sé ina fhócas mór taighde leis an Teileascóp Spáis James Webb áit

a bhfuil sé ina chomh-Phríomhthaighdeoir ar cheann de na hionstraimí Eorpacha.

Sa Gheoifisic tá an obair ag Segei Lebedev agus a mhac léinn Andrew Schaeffer ar shamhlacha tómagrafacha domhanda ag cothú spéise go forleathan agus tugadh aitheantas don obair sin le bronnadh an Ghradaim Taighde Iarchéime Tionscnaimh ag grúpa fócais an Aontais Gheoifisce Mheiriceánaigh um Staidéar ar Thaobh Istigh Domhain an Domhain. Léiríonn a samhlacha struchtúr mhaintlín uachtarach an Domhain le mionsonraí nach bhfacthas a leithéid roimhe agus mar aon leis an samhaltú domhanda, is bunús anois iad le sraith de fhiosruithe réigiúnacha.

Saincheisteanna tábhachtacha a bhaineann le gach aon duine againn is ea soláthairtí fuinnimh agus an gá lenár spleáchas ar charbóin iontaise a laghdú. Cé nach dócha go mbeidh fuinneamh geoiteirmeach riamh ina mhórfhoinse fuinnimh in Éirinn, tá féidearthacht ag baint leis, ach go háirithe do théamh limistéir ar ghrád íseal. Tá an tionscadal IRETherm le maoiniú ó SFI a fhéachann le suirbhé a dhéanamh ar acmhainní fuinnimh gheoiteirmigh ag druidim chun deiridh agus tá sonraí suimiúla nua soláthraithe aige in dhá phríomhréimse. Ar dtús, tá suirbhé déanta ar charraigeacha doimhne te tirime i bhfoirm réad eibhir i nGaillimh, Laighin agus sa Mhí. Sa dara háit, tá fiosrú déanta ar foinsí bogthe ghleann na Life mar thascairí ar uiscigh the. Braitheann an dá staidéar go mór ar shuirbhéanna maighnéada-teallúracha chun cur le faisnéis gheolaíoch.



*Attending a lecture entitled "Advanced Researches of Earthquakes and tsunamis Based on Lessons Learned from the Great East Japan Earthquake 2011".*

*Back row l-r: Dr. Vincent Cunnane, Chairman of Council, Prof. Luke Drury, Director School of Cosmic Physics, Prof. Alan Jones, Cecil Keaveney, Registrar, Tom Blake. Front row l-r: His Excellency Ambassador Chihiro Atsumi, Dr. Yoshiyuki Kaneda of the Japan Agency for Marine-Earth Science and Technology [JAMSTEC].*

*Ag freastal ar léacht dar teideal "Advanced Researches of Earthquakes and tsunamis based on lessons learned from the Great East Japan Earthquake 2011".*

*Líne chuíl c-d: An Dr. Vincent Cunnane, Cathaoirleach na Comhairle, An tOll. Luke Drury, Stiúrthóir Scoil na Fisice Cosmaí, An tOll. Alan Jones, Cecil Keaveney, Cláraitheoir, Tom Blake.*

*Líne thosaigh c-d: A Shoilse an tAmbasadóir Chihiro Atsumi, An Dr. Yoshiyuki Kaneda, Gníomhaireacht Domhaneolaíochta Mhuirí agus Teicneolaíochta [JAMSTEC].*

## School of Cosmic Physics (continued)

Energy supplies and the need to reduce our dependence on fossil carbon are important issues facing all of us. While geothermal energy is never likely to be a major source of energy in Ireland, it does have potential especially for low-grade district heating. The SFI-funded IRETherm project which aims to survey Ireland's geothermal energy resources is nearing completion and has delivered interesting new data in two main areas. Firstly, deep hot dry rocks in the form of granite bodies have been surveyed in Galway, Leinster and Meath. Secondly, the warm springs of the Liffey valley have been investigated as indicators of hot aquifers. Both studies rely heavily on magneto-telluric surveys to complement geological information.

In outreach and communications the School cooperated with the Japanese embassy in organising a symposium by Dr Kaneda, Project Leader of the Earthquake and Tsunami Research Project for Disaster Prevention, on lessons learned from the great East Japan earthquake of 2011 and the devastating tsunami it generated. The annual statutory public lecture of the School was given by Prof Etienne Parizot from the University of Paris (a former researcher in the School) in TCD and was entitled "Cosmic Rays: a century of adventure and mysteries!". Luke Drury collaborated with artist Aisleen O'Beirn on her "Quaternion Quest" exhibition in Dublin City Council's LAB space as part of which a public conversation took place between Luke Drury and the physicist and poet Iggy McGovern on the connections between William Rowan Hamilton, Dunsink Observatory, Quaternions and poetry. A large number of outreach events, including the traditional "open nights", were held at Dunsink Observatory and the successful "Seismology in Schools" programme continued.

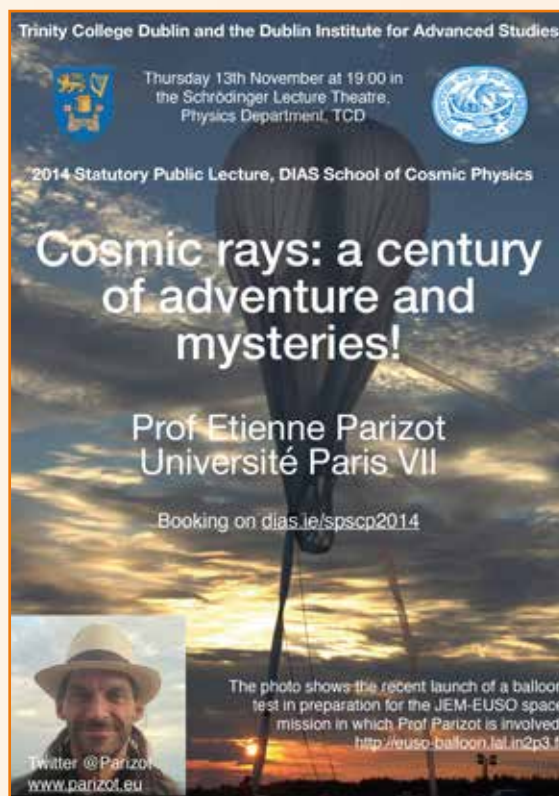


DIAS is involved with a new instrument called GRAVITY in collaboration with the Max Planck Institute for Astronomy in Heidelberg. The instrument will be shipped to the European Southern Observatory in Chile at Paranal in 2015. GRAVITY is a second generation instrument for the Very Large Telescope (VLT) Interferometer and will allow the measurement of the positions and motions of astronomical objects on scales far smaller than is currently possible. It will study not only the black hole at the centre of the Milky Way but also the birth of stars and planets which is of primary interest to DIAS. Credit: MPE/GRAVITY team.

Tá DIAS páirteach le hionstraim nua ar a dtugtar GRAVITY i gcomhar leis an institiúid réalteolaíochta Max Planck i Heidelberg. Seolfar an ionstraim chuig an Réadlann Eorpach sa Leathsféar Theas sa tSile ag Paranal in 2015. Ionstraim den dara ghlúin is ea GRAVITY do Thrasnamhéadar an Teileascóip An-Mhór (VLT) agus cuideoidh sí le tomhas ar shuíomhanna agus gluaiseachtaí de réada réalteolaíocha ar scálaí í bhfad níos lú ná mar atá indéanta faoi láthair. Déanfaidh sí staidéar, ní hamháin ar an dúpholl i gcroílár Bhealach na Bó Finne, ach freisin ar bhreith réaltaí agus pláinéad, an rud is mó a bhfuil suim ag DIAS ann. Creidiúint: Foireann MPE/GRAVITY.

## Scoil na Fisice Cosmaí [ar leanúint]

Maidir le cúrsaí for-rochtana agus cumarsáide, chomhoibrigh an Scoil le hambasáid na Seapáine san eagrú ar shiompóisiam leis an Dr Kaneda, Ceannaire Tionscadail don Tionscadal Taighde Um Chrith Talún agus Súnámaí um Chosc Tubaiste, maidir le ceachtanna a foghlaimíodh ó chrith talún ollmhór na Seapáine Thoir i 2011 agus an súnámaí tubaisteach a ghin sé. Tugadh léacht phoiblí reachtúil na Scoile ag an tOllamh Etienne Parizot ó Ollscoil Pháras (iar-thaighdeoir sa Scoil) i gColáiste na Tríonóide agus ba é "Cosmic Rays: a century of adventure and mysteries!" an teideal. D'oibrigh Luke Drury i gcomhar leis an ealaíontóir Aisleen O'Beirn ar a taispeántas "Quaternion Quest" i spás LAB Chomhairle Cathrach Átha Cliath agus mar chuid de sin bhí comhrá poiblí ann idir Luke Drury agus an fisiceoir agus file Iggy McGovern maidir leis na naisc idir William Rowan Hamilton, Réadlann Dhún Sinche, Ceathairnín agus an fhilíocht. Eagraíodh líon mór d'ócáidí for-rochtana, lena n-áirítear na "hoícheanta oscailte" traidisiúnta, ag Réadlann Dhún Sinche agus leanadh den chlár rathúil "Seismeolaíocht sna Scoileanna".



The statutory public lecture of the School for\*\* 2014, entitled "Cosmic Rays: a century of adventure and mysteries!" was given by Professor Etienne Parizot of the Université Paris VII, a former postdoctoral researcher in the School. Professor Parizot was introduced by the Provost of Trinity, Professor Patrick Pendergast.

Thug an tOllamh Etienne Parizot ó Université Paris VII, taighdeoir iardhochtúireachta sa Scoil an léacht reachtúil phoiblí Scoil na Fisice Cosmaí dar teideal "Cosmic Rays: a century of adventure and mysteries!". Chuir Propast Choláiste na Tríonóide, an tOllamh Patrick Pendergast an tOllamh Parizot in aithne don lucht éisteachta.



## Astronomy & Astrophysics

### Peer-reviewed Publications in 2014

- 1 A. Abramowski et al. "Diffuse Galactic gamma-ray emission with H.E.S.S." In: *Phys. Rev. D* 90.12, 122007 [Dec. 2014], p. 122007. DOI: 10.1103/PhysRevD.90.122007.
- 2 A. Abramowski et al. "Discovery of the Hard Spectrum VHE  $\gamma$ -Ray Source HESS J1641-463". In: *ApJ* 794, L1 [Oct. 2014], p. L1. DOI: 10.1088/2041-8205/794/1/L1. arXiv: 1408.5280 [astro-ph.HE].
- 3 A. Abramowski et al. "HESS J1640-465 - an exceptionally luminous TeV  $\gamma$ -ray supernova remnant". In: *MNRAS* 439 [Apr. 2014], pp. 2828-2836. DOI: 10.1093/mnras/stu139. arXiv: 1401.4388 [astro-ph.HE].
- 4 A. Abramowski et al. "Search for dark matter annihilation signatures in H.E.S.S. observations of dwarf spheroidal galaxies". In: *Phys. Rev. D* 90.11, 112012 [Dec. 2014], p. 112012. DOI: 10.1103/PhysRevD.90.112012.
- 5 S. Adrián-Martínez et al. "Deep sea tests of a prototype of the KM3NeT digital optical module". In: *European Physical Journal C* 74 (Sept. 2014), p. 3056. DOI: 10.1140/epjc/s10052-014-3056-3. arXiv: 1405.0839 [astro-ph.IM].
- 6 R. E. Ainsworth et al. "Tentative Evidence for Relativistic Electrons Generated by the Jet of the Young Sun-like Star DG Tau". In: *ApJ* 792, L18 [Sept. 2014], p. L18. DOI: 10.1088/2041-8205/792/1/L18. arXiv: 1408.1892 [astro-ph.SR] [cit. on p. 1].
- 7 J. M. Alcalá et al. "X-shooter spectroscopy of young stellar objects. IV. Accretion in low-mass stars and substellar objects in Lupus". In: *A&A* 561, A2 [Jan. 2014], A2. DOI: 10.1051/0004-6361/201322254. arXiv: 1310.2069 [astro-ph.SR] [cit. on p. 2].
- 8 E. Aliu et al. "Long-term TeV and X-Ray Observations of the Gamma-Ray Binary HESS J0632+057". In: *ApJ* 780, 168 [Jan. 2014], p. 168. DOI: 10.1088/0004-637X/780/2/168. arXiv: 1311.6083 [astro-ph.HE].
- 9 I. Babyk and A. Del Popolo. "Correlations in Relaxed Clusters of Galaxies". In: *Baltic Astronomy* 23 [2014], pp. 9-26.
- 10 M. T. Beltrán et al. "Filamentary structure and Keplerian rotation in the high-mass star-forming region G35.03+0.35 imaged with ALMA". In: *A&A* 571, A52 [Nov. 2014], A52. DOI: 10.1051/0004-6361/201424031 [cit. on p. 2].
- 11 R. Cesaroni et al. "Imaging the disk around IRAS 20126+4104 at subarcsecond resolution". In: *A&A* 566, A73 [June 2014], A73. DOI: 10.1051/0004-6361/201323065 [cit. on p. 3].
- 12 M. Chernyakova et al. "Multiwavelength observations of the binary system PSR B1259-63/LS 2883 around the 2010-2011 periastron passage". In: *MNRAS* 439 [Mar. 2014], pp. 432-445. DOI: 10.1093/mnras/stu021. arXiv: 1401.1386 [astro-ph.HE] [cit. on p. 16].
- 13 G. Costigan et al. "Temperaments of young stars: rapid mass accretion rate changes in T Tauri and Herbig Ae stars". In: *MNRAS* 440 [June 2014], pp. 3444-3461. DOI: 10.1093/mnras/stu529. arXiv: 1403.4088 [astro-ph.SR] [cit. on p. 3].
- 14 P. Dawson et al. "Near-infrared spectroscopy of young brown dwarfs in upper Scorpius". In: *MNRAS* 442 [Aug. 2014], pp. 1586-1596. DOI: 10.1093/mnras/stu973. arXiv: 1405.3842 [astro-ph.SR] [cit. on p. 3].
- 15 T. P. Downes and L. O. Drury. "Cosmic ray pressure driven magnetic field amplification: dimensional, radiative and field orientation effects". In: *MNRAS* 444 [Oct. 2014], pp. 365-375. DOI: 10.1093/mnras/stu1447. arXiv: 1407.5664 [astro-ph.HE] [cit. on p. 17].
- 16 A. Frank et al. "Jets and Outflows from Star to Cloud: Observations Confront Theory". In: *Protostars and Planets VI* [2014], pp. 451-474. DOI: 10.2458/azu\_uapress\_9780816531240-ch020. arXiv: 1402.3553 [astro-ph.SR] [cit. on p. 4].
- 17 N. Furukawa et al. "The Jet and Arc Molecular Clouds toward Westerlund 2, RCW 49, and HESS J1023-575  $^{12}\text{CO}$  and  $^{13}\text{CO}$  [ $J = 2-1$  and  $J = 1-0$ ] observations with NANTEN2 and Mopra Telescope". In: *ApJ* 781, 70 [Feb. 2014], p. 70. DOI: 10.1088/0004-637X/781/2/70. arXiv: 1401.4845 [astro-ph.GA].
- 18 S. Gabici and F. A. Aharonian. "Hadronic gamma-rays from RX J1713.7-3946?". In: *MNRAS* 445 [Nov. 2014], pp. L70-L73. DOI: 10.1093/mnras/slu132. arXiv: 1406.2322 [astro-ph.HE] [cit. on p. 12].
- 19 A. Giannetti et al. "ATLASGAL-selected massive clumps in the inner Galaxy. I. CO depletion and isotopic ratios". In: *A&A* 570, A65 [Oct. 2014], A65. DOI: 10.1051/0004-6361/201423692. arXiv: 1407.2215 [cit. on p. 5].
- 20 H. E. S. S. Collaboration et al. "HESS J1818-154, a new composite supernova remnant discovered in TeV gamma rays and X-rays". In: *A&A* 562, A40 [Feb. 2014], A40. DOI: 10.1051/0004-6361/201322914. arXiv: 1310.6956 [astro-ph.HE].
- 21 H. E. S. S. Collaboration et al. "H.E.S.S. observations of the Crab during its March 2013 GeV gamma-ray flare". In: *A&A* 562, L4 [Feb. 2014], p. L4. DOI: 10.1051/0004-6361/201323013. arXiv: 1311.3187 [astro-ph.HE].
- 22 H. E. S. S. Collaboration et al. "Search for extended  $\gamma$ -ray emission around AGN with H.E.S.S. and Fermi-LAT". In: *A&A* 562, A145 [Feb. 2014], A145. DOI: 10.1051/0004-6361/201322510. arXiv: 1401.2915 [astro-ph.HE].
- 23 J. Hawkes et al. "Investigation of Dense Gas Towards Relativistic Outflow Sources". In: *International Journal of Modern Physics Conference Series* 28, 1460198 [Mar. 2014], p. 60198. DOI: 10.1142/S2010194514601987. arXiv: 1404.3463 [astro-ph.HE].
- 24 H.E.S.S. Collaboration et al. "Flux upper limits for 47 AGN observed with H.E.S.S. in 2004-2011". In: *A&A* 564, A9 [Apr. 2014], A9. DOI: 10.1051/0004-6361/201322897. arXiv: 1402.2332 [astro-ph.GA].
- 25 H.E.S.S. Collaboration et al. "Long-term monitoring of PKS 2155-304 with ATOM and H.E.S.S.: investigation of optical/ $\gamma$ -ray correlations in different spectral states". In: *A&A* 571, A39 [Nov. 2014], A39. DOI: 10.1051/0004-6361/201424142.

- 26 H.E.S.S. Collaboration et al. "Search for TeV Gamma-ray Emission from GRB 100621A, an extremely bright GRB in X-rays, with H.E.S.S." In: *A&A* 565, A16 [May 2014], A16. DOI: 10.1051/0004-6361/201322984. arXiv: 1405.0488 [astro-ph.HE].
- 27 H.E.S.S. Collaboration et al. "TeV  $\gamma$ -ray observations of the young synchrotron-dominated SNRs G1.9+0.3 and G330.2+1.0 with H.E.S.S." In: *MNRAS* 441 [June 2014], pp. 790–799. DOI: 10.1093/mnras/stu459. arXiv: 1404.1613 [astro-ph.HE].
- 28 E. Kafexhiu et al. "Parametrization of gamma-ray production cross sections for p p interactions in a broad proton energy range from the kinematic threshold to PeV energies". In: *Phys. Rev. D* 90.12, 123014 [Dec. 2014], p. 123014. DOI: 10.1103/PhysRevD.90.123014. arXiv: 1406.7369 [astro-ph.HE] [cit. on p. 12].
- 29 S. R. Kelner et al. "The Beaming Pattern of External Compton Emission from Relativistic Outflows: The Case of Anisotropic Distribution of Electrons". In: *ApJ* 785, 141 [Apr. 2014], p. 141. DOI: 10.1088/0004-637X/785/2/141.
- 30 D. Khangulyan, F. A. Aharonian, and S. R. Kelner. "Simple Analytical Approximations for Treatment of Inverse Compton Scattering of Relativistic Electrons in the Blackbody Radiation Field". In: *ApJ* 783, 100 [Mar. 2014], p. 100. DOI: 10.1088/0004-637X/783/2/100. arXiv: 1310.7971 [astro-ph.HE].
- 31 D. Khangulyan, S. V. Bogovalov, and F. A. Aharonian. "Binary Pulsar System PSR B1259-63/LS2883 as a Gamma-Ray Emitter". In: *International Journal of Modern Physics Conference Series* 28, 1460169 [Mar. 2014], p. 60169. DOI: 10.1142/S2010194514601690.
- 32 P. Lang et al. "Modelling the hidden magnetic field of low-mass stars". In: *MNRAS* 439 [Apr. 2014], pp. 2122–2131. DOI: 10.1093/mnras/stu091. arXiv: 1401.4545 [astro-ph.SR] [cit. on p. 5].
- 33 H. B. Liu et al. "TimeMonitoring of Radio Jets and Magnetospheres in the Nearby Young Stellar Cluster R Coronae Australis". In: *ApJ* 780, 155 [Jan. 2014], p. 155. DOI: 10.1088/0004-637X/780/2/155. arXiv: 1311.4761 [astro-ph.SR].
- 34 R.-Y. Liu et al. "Diffuse PeV neutrinos from EeV cosmic ray sources: Semirelativistic hypernova remnants in star-forming galaxies". In: *Phys. Rev. D* 89.8, 083004 [Apr. 2014], p. 083004. DOI: 10.1103/PhysRevD.89.083004. arXiv: 1310.1263 [astro-ph.HE].
- 35 C. F. Manara et al. "An X-Shooter Analysis of Chromospheric Activity of Class III Low Mass Sources". In: *Astrophysics and Space Science Proceedings* 36 [2014], p. 45. DOI: 10.1007/978-3-319-03041-8\_8 [cit. on p. 6].
- 36 C. F. Manara et al. "Gas content of transitional disks: a VLT/X-Shooter study of accretion and winds". In: *A&A* 568, A18 [Aug. 2014], A18. DOI: 10.1051/0004-6361/201323318. arXiv: 1406.1428 [astro-ph.SR] [cit. on p. 6].
- 37 L. Maurri et al. "Physical properties of the jet from DG Tauri on sub-arcsecond scales with HST/STIS". In: *A&A* 565, A110 [May 2014], A110. DOI: 10.1051/0004-6361/201117510. arXiv: 1401.0483 [astro-ph.SR] [cit. on p. 7].
- 38 A. Miotello et al. "Grain growth in the envelopes and disks of Class I protostars". In: *A&A* 567, A32 [July 2014], A32. DOI: 10.1051/0004-6361/201322945. arXiv: 1405.0821 [astro-ph.SR] [cit. on p. 7].
- 39 K. Mužić et al. "Substellar Objects in Nearby Young Clusters (SONYC). VIII. Substellar Population in Lupus 3". In: *ApJ* 785, 159 [Apr. 2014], p. 159. DOI: 10.1088/0004-637X/785/2/159. arXiv: 1403.0813 [astro-ph.GA] [cit. on p. 7].
- 40 A. Natta et al. "X-shooter spectroscopy of young stellar objects. V. Slow winds in T Tauri stars". In: *A&A* 569, A5 [Sept. 2014], A5. DOI: 10.1051/0004-6361/201424136. arXiv: 1406.5630 [astro-ph.SR] [cit. on p. 8].
- 41 W. O'Keeffe and T. P. Downes. "Multifluid simulations of the magnetorotational instability in protostellar discs". In: *MNRAS* 441 [June 2014], pp. 571–581. DOI: 10.1093/mnras/stu597. arXiv: 1403.8149 [astro-ph.SR] [cit. on p. 8].
- 42 P. Pinilla et al. "Millimetre spectral indices of transition disks and their relation to the cavity radius". In: *A&A* 564, A51 [Apr. 2014], A51. DOI: 10.1051/0004-6361/201323322. arXiv: 1402.5778 [astro-ph.EP] [cit. on p. 9].
- 43 L. Ricci et al. "Brown Dwarf Disks with ALMA". In: *ApJ* 791, 20 [Aug. 2014], p. 20. DOI: 10.1088/0004-637X/791/1/20. arXiv: 1406.0635 [astro-ph.EP] [cit. on p. 9].
- 44 D. Rodgers-Lee et al. "The Herschel view of circumstellar discs: a multiwavelength study of Chamaeleon-I". In: *MNRAS* 443 [Sept. 2014], pp. 1587–1600. DOI: 10.1093/mnras/stu908. arXiv: 1405.3833 [astro-ph.SR] [cit. on p. 9].
- 45 N. Sahakyan et al. "On the Gamma-Ray Emission from the Core and Radio Lobes of the Radio Galaxy Centaurus a". In: *International Journal of Modern Physics Conference Series* 28, 1460182 [Mar. 2014], p. 60182. DOI: 10.1142/S2010194514601823.
- 46 Á. Sánchez-Monge et al. "A necklace of dense cores in the high-mass star forming region G35.20-0.74 N: ALMA observations". In: *A&A* 569, A11 [Sept. 2014], A11. DOI: 10.1051/0004-6361/201424032. arXiv: 1406.4081 [cit. on p. 10].
- 47 A. M. Taylor. "The Need for Hard Spectra Sources of Nearby Heavy Cosmic Rays". In: *International Journal of Modern Physics Conference Series* 28, 1460184 [Mar. 2014], p. 60184. DOI: 10.1142/S2010194514601847.
- 48 A.M. Taylor. "UHECR composition models". In: *Astroparticle Physics* 54 [Feb. 2014], pp. 48–53. DOI: 10.1016/j.astropartphys.2013.11.006. arXiv: 1401.0199 [astro-ph.HE].
- 49 A. M. Taylor, S. Gabici, and F. Aharonian. "Galactic halo origin of the neutrinos detected by IceCube". In: *Phys. Rev. D* 89.10, 103003 [May 2014], p. 103003. DOI: 10.1103/PhysRevD.89.103003. arXiv: 1403.3206 [astro-ph.HE].



- 50 L. Testi et al. "Dust Evolution in Protoplanetary Disks". In: *Protostars and Planets VI* [2014], pp. 339–361. DOI: 10.2458/azu\_uapress\_9780816531240-ch015. arXiv: 1402.1354 [astro-ph.SR] [cit. on p. 10].
- 51 A. Thornbury and L. O. Drury. "Power requirements for cosmic ray propagation models involving re-acceleration and a comment on second-order Fermi acceleration theory". In: *MNRAS* 442 [Aug. 2014], pp. 3010–3012. DOI: 10.1093/mnras/stu1080. arXiv: 1404.2104 [astro-ph.HE] [cit. on p. 17].
- 52 J. S. Urquhart et al. "ATLASGAL – Complete compact source catalogue". In: *A&A* 568, A41 [Aug. 2014], A41. DOI: 10.1051/0004-6361/201424126. arXiv: 1406.5741 [cit. on p. 11].
- 53 M. S. Väisälä et al. "High-resolution ammonia mapping of the very young protostellar core Chamaeleon-MMS1". In: *A&A* 564, A99 [Apr. 2014], A99. DOI: 10.1051/0004-6361/201322069. arXiv: 1311.7576 [cit. on p. 11].
- 54 A. A. Vidotto et al. "M-dwarf stellar winds: the effects of realistic magnetic geometry on rotational evolution and planets". In: *MNRAS* 438 [Feb. 2014], pp. 1162–1175. DOI: 10.1093/mnras/stt2265. arXiv: 1311.5063 [astro-ph.SR].
- 55 F. Voisin et al. "Mopra and Nanten Studies of Hess J1825–137 Northern Cloud". In: *International Journal of Modern Physics Conference Series* 28, 1460199 [Mar. 2014], p. 60199. DOI: 10.1142/S2010194514601999.
- 56 E. T. Whelan et al. "Accretion-ejection connection in the young brown dwarf candidate ISOChal 217". In: *A&A* 570, A59 [Oct. 2014], A59. DOI: 10.1051/0004-6361/201424067. arXiv: 1408.5011 [astro-ph.SR] [cit. on p. 12].
- 57 E. T. Whelan et al. "Erratum: "Classical T Tauri-like Outflow Activity in the Brown Dwarf Mass Regime" <A href=""/abs/2009ApJ...706.1054W">[2009, ApJ, 706, 1054]</A>". In: *ApJ* 788, 194 [June 2014], p. 194. DOI: 10.1088/0004-637X/788/2/194.
- 58 R.-z. Yang, F. Aharonian, and R. Crocker. "The Fermi bubbles revisited". In: *A&A* 567, A19 [July 2014], A19. DOI: 10.1051/0004-6361/201423562. arXiv: 1402.0403 [astro-ph.HE].
- 59 R.-z. Yang, E. de Oña Wilhelmi, and F. Aharonian. "Probing cosmic rays in nearby giant molecular clouds with the Fermi Large Area Telescope". In: *A&A* 566, A142 [June 2014], A142. DOI: 10.1051/0004-6361/201321044. arXiv: 1303.7323 [astro-ph.HE].
- 60 V. N. Zirakashvili et al. "Nonthermal Radiation of Young Supernova Remnants: The Case of Cas A". In: *ApJ* 785, 130 [Apr. 2014], p. 130. DOI: 10.1088/0004-637X/785/2/130. arXiv: 1308.3742 [astro-ph.HE].
- 61 F. Aharonian and F. Rieger. "Preface". In: *International Journal of Modern Physics Conference Series* 28, 1402005 [2014], p. 2005. DOI: 10.1142/S2010194514020054.
- 62 M. Chernyakova and D. Malyshev. "Origin of the high energy emission from the Galactic Center". In: *40th COSPAR Scientific Assembly. Held 2-10 August 2014, in Moscow, Russia, Abstract E1.2-25-14*. Vol. 40. COSPARMeeting. 2014, p. 531.
- 63 M. Chernyakova, D. Malyshev, and A. Neronov. "Origin of the high energy emission from the Galactic Center". In: *The X-ray Universe 2014*. July 2014, p. 47.
- 64 M. Chernyakova, A. Neronov, and D. Malyshev. "Multi-component high-energy emission from gamma-ray binary LS 5039". In: *The X-ray Universe 2014*. July 2014, p. 237.
- 65 P. Dawson et al. "VizieR Online Data Catalog: New brown dwarf discs in Upper Scorpius [Dawson+,2013]". In: *VizieR Online Data Catalog* 742 [Mar. 2014], p. 90903.
- 66 D. Khangulyan, F. Aharonian, and S. Kelner. "Synchrotron X-ray radiation in highly turbulent fields". In: *The X-ray Universe 2014*. July 2014, p. 99.
- 67 D. Malyshev, A. Neronov, and M. Chernyakova. "Flaring activity from PSR B1259–63". In: *The Astronomer's Telegram* 6204 [June 2014], p. 1.
- 68 K. Muzic et al. "The SONYC survey: Towards a complete census of brown dwarfs in star forming regions". In: *Revista Mexicana de Astronomía y Astrofísica Conference Series*. Vol. 44. Revista Mexicana de Astronomía y Astrofísica, vol. 27. Oct. 2014, pp. 141–142.
- 69 L. O'Shaughnessy, P. Callanan, and M. Chernyakova. "Searching for Gamma-Ray Binaries using the Fermi Second Source Catalog". In: *The X-ray Universe 2014*. July 2014, p. 296.
- 70 T. Takahashi et al. "The ASTRO-H X-ray astronomy satellite". In: *Society of Photo-Optical Instrumentation Engineers [SPIE] Conference Series*. Vol. 9144. Society of Photo-Optical Instrumentation Engineers [SPIE] Conference Series. July 2014, p. 25. DOI: 10.1117/12.2055681. arXiv: 1412.1356 [astro-ph.IM].
- 71 O. Tibolla and L. Drury. "Prolegomena". In: *Nuclear Physics B Proceedings Supplements* 256 [Nov. 2014], pp. 1–8. DOI: 10.1016/j.nuclphysbps.2014.10.001.
- 72 M. Walls and M. Chernyakova. "Variability of Sgr A\*, Monte Carlo code for X-Ray Emission". In: *The X-ray Universe 2014*. July 2014, p. 330.
- 73 K. S. Wood et al. "Gamma-Ray Activity from the Binary System PSR B1259–63/SS 2283 Near its 2014 Periastron". In: *AAS/High Energy Astrophysics Division*. Vol. 14. AAS/High Energy Astrophysics Division. Aug. 2014, p. 114.16.
- 74 K. S. Wood et al. "Multi-wavelength Observations of the Binary System PSR B1259–63/LS 2883 Around the 2010–2011 Periastron Passage". In: *American Astronomical Society Meeting Abstracts #223*. Vol. 223. American Astronomical Society Meeting Abstracts. Jan. 2014, p. 323.05.
- 75 V. Zirakashvili et al. "Particle acceleration and nonthermal emission in supernova remnant Cas A". In: *40th COSPAR Scientific Assembly. Held 2-10 August 2014, in Moscow, Russia, Abstract E1.6-40-14*. Vol. 40. COSPARMeeting. 2014, p. 3855.

## Publications in 2014 (not subject to peer-review)

- 61 F. Aharonian and F. Rieger. "Preface". In: *International Journal of Modern Physics Conference Series* 28, 1402005 [2014], p. 2005. DOI: 10.1142/S2010194514020054.

## Preprints posted in 2014 and not yet published

- 76 A. Abramowski et al. "Long-term monitoring of PKS 2155+304 with ATOM and H.E.S.S.: investigation of optical/\$\gamma\$-ray correlations in different spectral states". In: *ArXiv eprints* [Aug. 2014]. arXiv: 1409.0253 [astro-ph.HE].
- 77 F. Aharonian et al. "ASTRO-H White Paper - Shock and Acceleration". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1175 [astro-ph.HE].
- 78 P. Bordas et al. "Detection of persistent gamma-ray emission from SS433/W50". In: *ArXiv eprints* [Nov. 2014]. arXiv: 1411.7413 [astro-ph.HE].
- 79 H. E. S. S. Collaboration et al. "Diffuse Galactic gamma-ray emission with H.E.S.S.". In: *ArXiv e-prints* [Nov. 2014]. arXiv: 1411.7568 [astro-ph.HE].
- 80 H. E. S. S. Collaboration et al. "Discovery of the VHE gamma-ray source HESS J1832-093 in the vicinity of SNR G22.7-0.2". In: *ArXiv e-prints* [Nov. 2014]. arXiv: 1411.0572 [astro-ph.HE].
- 81 H. E. S. S. Collaboration et al. "H.E.S.S. detection of TeV emission from the interaction region between the supernova remnant G349.7+0.2 and a molecular cloud". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.2251 [astro-ph.HE].
- 82 H. E. S. S. Collaboration et al. "H.E.S.S. reveals a lack of TeV emission from the supernova remnant Puppis A". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.6997 [astro-ph.HE].
- 83 H. E. S. S. Collaboration et al. "Search for dark matter annihilation signatures in H.E.S.S. observations of Dwarf Spheroidal Galaxies". In: *ArXiv e-prints* [Oct. 2014]. arXiv: 1410.2589 [astro-ph.HE].
- 84 J. P. Hughes et al. "ASTRO-H White Paper - Young Supernova Remnants". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1169 [astro-ph.HE].
- 85 S. Kitamoto et al. "ASTRO-H White Paper - Accreting Pulsars, Magnetars, and Related Sources". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1165 [astro-ph.HE].
- 86 K. Koyama et al. "ASTRO-H White Paper - Plasma Diagnostic and Dynamics of the Galactic Center Region". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1170 [astro-ph.HE].
- 87 K. S. Long et al. "ASTRO-H White Paper - Older Supernova Remnants and Pulsar Wind Nebulae". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1166 [astro-ph.HE].
- 88 J. M. Miller et al. "ASTRO-H White Paper - Stellar-Mass Black Holes". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1173 [astro-ph.HE].
- 89 L. O'C. Drury. "Origin(s) of Cosmic Rays". In: *ArXiv e-prints* [Dec. 2014]. arXiv: 1412.1376 [astro-ph.HE].
- 90 The H. E. S. S. Collaboration et al. "Probing the gamma-ray emission from HESS J1834-087 using H.E.S.S. and Fermi LAT observations". In: *ArXiv e-prints* [July 2014]. arXiv: 1407.0862 [astro-ph.HE].
- 91 R.-z. Yang, D. I. Jones, and F. Aharonian. "Fermi-LAT observations of the Sagittarius B complex". In: *ArXiv e-prints* [Oct. 2014]. arXiv: 1410.7639 [astro-ph.HE].

## Geophysics

### Publications in International Literature

- 1 Adetunji, A.Q., I.J. Ferguson, and **A.G. Jones** [2014], Crustal and lithospheric scale structures of the Precambrian Superior-Grenville margin. *Tectonophysics*, **614**, 146-169, doi:10.1016/j.tecto.2013.12.008.
- 2 Adetunji, A.Q., I.J. Ferguson, and **A.G. Jones**, [2014], Imaging the lithosphere of the Grenville Province: large-scale structures and electrical anisotropy. *Geophysical Journal International*, submitted 29 January 2014.
- 3 Adetunji, A.Q., I.J. Ferguson, and **A.G. Jones**, [2014], Magnetotelluric imaging of the lower Great Lakes region, Canada. *Geophysical Journal International*, submitted 29 January 2014.
- 4 **Agius, M.R.**, and **S. Lebedev** [2014], Shear-velocity structure, radial anisotropy and dynamics of the Tibetan crust. *Geophys. J. Int.*, **199**, 1395-1415.
- 5 Amato, A., I. Bianchi and **N. Piana Agostinetti** [2014], Apulian crust: top to bottom, *J. of Geodynamics*, in press
- 6 Becker, T.W., C.P. Conrad, **A. J. Schaeffer**, and **S. Lebedev** [2014], Origin of azimuthal seismic anisotropy in oceanic plates and mantle. *Earth Planet. Sci. Lett.*, **401**, 236-250.
- 7 Bezák, V., J. Pek, **J. Vozár**, and M. Bielík [2014], Geoelectrical and geological structure of the crust in Western Slovakia. *Studia Geophysica et Geodaetica*, **58**, 473-488, DOI: 10.1007/s11200-013-0491-9.
- 8 Burov, E., T. Francois, P. Agard, L. Le Pourhiet, B. Meyer, **C. Tirel**, **S. Lebedev**, P. Yamato, J.-P. Brun [2014], Rheological and geodynamic controls on the mechanisms of subduction and HP/UHP exhumation of crustal rocks during continental collision: Insights from numerical models. *Invited Review, Tectonophysics*, DOI: 10.1016/j.tecto.2014.04.033.
- 9 **Campanyà, J.**, J. Ledo, P. Queralt, A. Marcuello, A.G. Jones [2014], A new methodology to estimate magnetotelluric [MT] tensor relationships: Estimation of Local transfer-functions by Combining Interstation Transfer-functions (ELICIT). *GJI*. **198** (1): 484-494. doi: 10.1093/gji/ggu147.
- 10 **Campanyà, J.**, **A.G. Jones**, **J. Vozar**, **V. Rath**, **S. Blake**, **R. Delhaye**, **T. Farrell** [2015], Porosity and Permeability Constraints from Electrical Resistivity Models: Examples Using Magnetotelluric Data. *Proceedings World Geothermal Congress 2015*. Melbourne, Australia, 19-25 April 2015 [Accepted].
- 11 Chiarabba, C., G. Giacomuzzi, I. Bianchi, **N. Piana Agostinetti** and J. Park [2014], Delamination-retreat in the northern Apennines, *Earth Pla. Sci. Lett.*, **403**, 108-116.
- 12 Dong, H., W. Wei, G. Ye, S. Jin, **A.G. Jones**, J. Jing, L. Zhang, C. Xie, F. Zhang, and H. Wang, [2014], Three dimensional electrical structure of the crust and upper mantle in Ordos and adjacent area: Magnetotelluric evidence of regional lithospheric modification. *Geochemistry, Geophysics, Geosystems*, **15**, doi: 10.1002/2014GC005270.

- 13 Fry, B., F. Davey, D. Eberhart-Phillips, **S. Lebedev** [2014], Depth variable crustal anisotropy, patterns of crustal weakness, and destructive earthquakes in Canterbury, New Zealand, *Earth Planet. Sci. Lett.*, **392**, 50–57.
- 14 **Fullea, J., M.R. Muller, A.G. Jones**, and J.C. Afonso [2014], The lithosphereasthenosphere system beneath Ireland from integrated geophysical-petrological modelling - II: 3D thermal and compositional structure. *Lithos*, **189**, 49–64, doi:10.1016/j.lithos.2013.09.014.
- 15 Govoni, A., A. Marchetti, P. De Gori, M. Di Bona, F. P. Lucente, C. Chiarabba, A. Nardi, L. Margheriti, L. Improta, **N. Piana Agostinetti**, R. Di Giovambattista, D. Latorre, M. Anselmi, M. G. Ciaccio, M. Moretti, C. Castellano, and D. Piccinini [2014], The 2012 Emilia seismic sequence (Northern Italy): imaging the thrust fault system by accurate aftershocks location, *Tectonophysics*, **622**, 44–55, doi: 10.1016/j.tecto.2014.02.013.
- 16 **Jones, A.G.** [2014], Reconciling different equations for proton conduction using the Meyer-Neldel compensation rule. *Geophysics, Geochemistry, Geosystems*, **15**, 337–349, doi:10.1002/2013GC004911.
- 17 **Jones, A.G.**, J.C. Afonso, **J. Fullea**, and F. Salajegheh [2014], The lithosphereasthenosphere system beneath Ireland from integrated geophysical-petrological modeling- I: Observations, 1D and 2D hypothesis testing and modelling. *Lithos*, **189**, 28–48, doi:10.1016/j.lithos.2013.10.033.
- 18 **Jones, A.G.**, [2014], Compensation of the Meyer-Neldel Compensation Law for H diffusion in minerals. *Geochemistry, Geophysics, Geosystems*, **15**, doi: 10.1002/2014GC005261.
- 19 **Jones, A.G.**, J. Ledo, I.J. Ferguson, J.A. Craven, M.J. Unsworth, M. Chouteau, and J.E. Spratt [2014], The electrical resistivity of Canada's lithosphere and correlation with other parameters: Contributions from LITHOPROBE and other programmes. *Canadian Journal of Earth Sciences*, accepted 08 January 2014.
- 20 **Jones, A.G.**, [2014], Proton conduction and hydrogen diffusion in olivine: Reconciling laboratory and field observations and implications for average grain size in the lithospheric mantle. *Geochemistry, Geophysics, Geosystems*, submitted 22 August 2014.
- 21 Kalscheuer, T., **S. Blake**, J.E. Podgorski, F. Wagner, A.G. Green, H. Maurer, **A.G. Jones**, **M. Muller**, O. Ntibinyane, and G. Tshoso, [2014], New insights into the hydrological system beneath the central Okavango Delta [Botswana] from joint inversions of three types of electromagnetic data explicitly constrained by seismic observations. *Geophysical Journal International*, submitted 14th May 2014, accepted subject to moderate revision, revised version submitted.
- 22 Kelbert, A., A. Kuvshinov, J. Velimsky, T. Koyama, J. Ribaudo, J. Sun, **Z. Martinec**, and C.J. Weiss [2014], Global 3-D electromagnetic forward modeling: A benchmark study. *Geophys. J. Int.*, **197**, 78 – 814, doi: 10.1093/gji/ggu028.
- 23 **Kiyan, D., A.G. Jones**, and **J. Vozar** [2014], The inability of magnetotelluric offdiagonal impedance tensor elements to sense oblique conductors in 3-D inversion. *Geophysical Journal International*, **196**, 1351–1364, doi:10.1093/gji/ggt470.
- 24 Konrad, H., M. Thoma, I. Sasgen, V. Klemann, K. Grosfeld, D. Barbi, and **Z. Martinec**, [2014], The deformational response of a viscoelastic solid Earth model coupled to a thermomechanical ice sheet model. *Surv. Geophys.*, **35**, 144–1458, doi: 10.1007/s10712-013-9257-8.
- 25 Legendre, C.P., F. Deschamps, L. Zhao, **S. Lebedev**, Q.-F. Chen [2014], Anisotropic Rayleigh-wave phase-velocity maps of Eastern China. *J. Geophys. Res.*, **119**, 4802–4820.
- 26 **Licciardi, A.**, and **N. Piana Agostinetti** [2014], High frequency Receiver Functions in the Dublin Basin: application to a geothermal potential site, *Energy Procedia*, **59**, 221 – 226.
- 27 **Licciardi, A., N. Piana Agostinetti, S. Lebedev, A. J. Schaeffer, P. W. Readman and C. Horan** [2014], Moho depth and Vp/Vs in Ireland from teleseismic receiver functions analysis, *Geophys J. Int.*, **199**, 561–579, doi: 10.1093/gji/ggu277
- 28 **Mandolesi, E.**, and **N. Piana Agostinetti** [2014], Trans-dimensional Monte Carlo sampling applied to the magnetotelluric inverse problem, submitted to *Journal of Physics: Conference Series*.
- 29 **Mandolesi, E.**, and **A.G. Jones** [2014], Magnetotelluric inversion based on Mutual Information. *Geophysics Journal International*, **199**, 242–252, doi: 10.1093/gji/ggu258.
- 30 **Martinec, Z.** [2014], Mass-density Green's functions for the gravitational gradient tensor at different heights. *Geophysical Journal International*, **196**, 1455–1465, doi:10.1093/gji/ggt495.
- 31 **Martinec, Z.**, and **J. Hagedoorn** [2014], The rotational feedback on linear-momentum balance in glacial isostatic adjustment. *Geophys. J. Int.*, **199**, 182–1846, doi: 10.1093/gji/ggu369.
- 32 **Martinec, Z.**, and **J. Fullea** [2014], A refined model of sedimentary rock cover in the southeastern part of the Congo basin from GOCE gravity and vertical gravity gradient observations. *Int. J. Appl. Earth Observation & Geoinformation*, doi:10.1016/j.jag.2014.03.001 [accepted March 5, 2014].
- 33 **Martinec, Z.**, I. Sasgen, and J. Velimsky, [2014], The forward and adjoint sensitivity methods of glacial isostatic adjustment: Existence, uniqueness, weak forms and timedifferencing schemes. *Geophys. J. Int.*, [submitted March 13, 2014].
- 34 **Miensopust, M., A.G. Jones**, G.P. Hersir, and A.M. Vilhjalmsón [2014], The Eyjafjallajökull volcanic system, Iceland: insights from electromagnetic measurements, accepted, 20 August 2014.
- 35 **Ogaya, X.**, P. Queralt, J. Ledo, A. Marcuello, and **A.G. Jones** [2014], Geoelectrical baseline model of the subsurface of the Hontomin site [Spain] for CO<sub>2</sub> geological storage in a deep saline aquifer: A 3D magnetotelluric characterisation. *International Journal of Greenhouse Gas Control*, **27**, 120–138, doi: 10.1016/j.ijggc.2014.04.030.
- 36 **Piana Agostinetti, N.** and M. S. Miller [2014], The fate of the downgoing oceanic plate: insight from the northern Cascadia subduction zone, *Earth Pla. Sci. Lett.*, **408**, 237–251, doi: 10.1016/j.epsl.2014.10.016.

- 37 **Piana Agostinetti N.**, G. Giacomuzzi, and A. Malinverno, [2014], Local 3D earthquake tomography by trans-dimensional Monte Carlo sampling, submitted to *Geophys J. Int.*
- 38 Piccinini, D, **N. Piana Agostinetti**, G. Saccorotti, A. Fiaschi, L. Matassoni, M. Morelli [2014], Orogen-parallel variability in 3D seismicity distribution, Northern Apennines [Italy]: evidence for a slab tear fault?, *J. of Geodynamics*, in press.
- 39 Saccorotti, G., D. Piccinini, M. Zupo, F. Mazzarini, C. Chiarabba, **N. Piana Agostinetti**, **A. Licciardi**, and M. Bagagli [2014], Passive, broad-band seismic measurements for geothermal exploration: The GAPSS experiment, *Energy Procedia*, **59**, 227 – 234.
- 40 **Schaeffer, A.J.**, and **S. Lebedev** [2014], Imaging the North American continent using waveform inversion of global and USArray data. *Earth Planet. Sci. Lett.*, **402**, 26–41.
- 41 **Schaeffer, A.J.**, and **S. Lebedev** [2014], Global heterogeneity of the lithosphere and underlying mantle: A seismological appraisal based on multimode surface-wave dispersion analysis, shear-velocity tomography, and tectonic regionalization. Invited Review in: "*The Earth's Heterogeneous Mantle*," Springer, in press.
- 42 **Share, P.-E.**, **A.G. Jones**, **M.R. Muller**, **D.T. Khoza**, **M.P. Miensoopust**, and S.J. Webb, [2014], An audio-magnetotelluric investigation of the Otjiwarongo and Katima Mulilo regions, Namibia. *Geophysics*, **79(4)**, B151–B171, doi: 10.1190/geo2013-0171.1. Note: This paper is denoted as a Case History.
- 43 Soomro, R.A., C. Weidle, L. Cristiano, **S. Lebedev**, and T. Meier, [2014], Automated inter-station measurements of surface-wave phase velocities: Application to central and northern Europe. *Geophys. J. Int.*, submitted February 17, 2014, in review.
- 44 Spratt, J., T. Skulski, J.A. Craven, **A.G. Jones**, D. Snyder, and **D. Kiyan**, [2014], Magnetotelluric investigations of the lithosphere beneath the central Rae Craton, mainland Nunavut, Canada. *Journal of Geophysical Research*, **119**, 2415–2439, doi:10.1002/2013JB010221.
- 45 Sun D., M. S. Miller, **N. Piana Agostinetti**, P. D. Asimow, and D. Li [2014], Modeling high frequency waves in the slab beneath Italy, *Earth Pla. Sci. Lett.*, **391**, 212–223, doi:10.1016/j.epsl.2014.01.034.
- 46 Tanaka, Y., T. Hasegawa, H. Tsuruoka, V. Klemann, **Z. Martinec**, [2014], Spectral-finite element approach to viscoelastic relaxation in a spherical compressible Earth: application to the gravity field variations due to the 2004 Sumatra-Andaman earthquake. *Geophys. J. Int.*, [submitted January 27, 2014].
- 47 **Vozar, J.**, **A.G. Jones**, **J. Fulla**, **M.R. Agius**, **S. Lebedev**, **F. Le Pape**, W. Wei [2014], Integrated geophysical-petrological modeling of lithosphere-asthenosphere boundary in central Tibet using electromagnetic and seismic data. *Geochem. Geophys. Geosyst.*, **15**, 3965–3988, doi:10.1002/2014GC005365.
- 48 Walter, C., **A.G. Jones**, and G.A. Ryan, [2014], The effects of model regularisation in 3D magnetotelluric inversions: An example of the Taupo Volcanic Zone, New Zealand. *Geophysical Journal International*, submitted 14 February 2014.
- 49 Wenbo W., **F. Le Pape**, **A.G. Jones**, **J. Vozar**, H. Dong, M.J. Unsworth, S. Jin, G. Ye, J. Jing, L. Zhang, C. Xie [2014], Northward channel flow in northern Tibet revealed from 3D magnetotelluric modelling, *Physics of the Earth and Planetary Interiors*, **235**, 13–24, DOI:10.1016/j.pepi.2014.07.004.
- 50 Wei, W., **F. Le Pape**, **A.G. Jones**, **J. Vozar**, H. Dong, M.J. Unsworth, S. Jin, G. Ye, J. Jing, L. Zhang, and C. Xie, [2014], Northward Channel flow in Northern Tibet revealed from 3D magnetotelluric modelling. *Physics of the Earth and Planetary Interiors*, **235**, 13–24, doi: 10.1016/j.pepi.2014.07.004.

## Theses

- Jan Dostal**: "Modelling of the Magnetic Field Induced by Ocean Circulation." Ph.D. thesis, Institute for Meteorology, Free University in Berlin, successfully defended in November 26, 2014 [supervisors Z.Martinec and M. Thoma].
- Emily Neenan**, "A Seismic Surface-Wave Study of Asia, Using Automated Broadband Interstation Measurements." An MSc thesis submitted to Trinity College Dublin [supervisor: S. Lebedev]. Degree awarded: November, 2014.

## Invited presentations

- Lebedev, S.**, 2014. Imaging Mediterranean lithospheric dynamics. Invited seminar, University of Nice, Sophia Antipolis. 17 April.
- Lebedev, S.**, T. Meier, **A.J. Schaeffer**, **M.R. Agius**, and **J. M.-C. Adam**, 2014. Seismic structure and dynamics of cratons: Stability and modification, continental collision and subduction, Invited Talk [29 April], EGU2014-1789, European Geosciences Union General Assembly 2014, Vienna, Austria, 27 April – 02 May.
- Lebedev, S.**, 2014. Dynamics of the Earth's Tectonic Plates: Insights from Seismic Structure and Anisotropy. Invited seminar, University College Dublin, 14 October.
- Schaeffer, A.J.**, and **S. Lebedev**, 2014. Seismic tomography of the Arctic: Structure and evolution of the lithosphere, Invited Talk, Workshop of the Circum-Arctic Lithosphere Evolution [CALE] Consortium, Vancouver, Canada, 18 October.
- Schaeffer, A.J.**, and **S. Lebedev**, 2014. Imaging the Mantle Transition Zone Using Multimode Waveform Tomography, Invited Talk, American Geophysical Union Fall Meeting, San Francisco, 15–19 December.



# School of Theoretical Physics

According to the DIAS Act and the STP Establishment Order of 1940 the duties of the school are to undertake and publish research into the mathematical principles of natural philosophy and the application of those principles to physics (including cosmology), the training of advanced students, the provision of facilities for university professors and lecturers on Leave of Absence from their academic duties and the organisation of seminars, conferences, and lectures. These lectures must include an annual statutory public lecture at UCD or TCD.

In 1940 the Irish universities were not yet able to fulfill these functions in a satisfactory way. This has changed, but university researchers are much more constrained due to other obligations and financial pressures. DIAS is more comparable to research institutes like the Princeton IAS (the model for DIAS) and the Max Planck Institutes. Most of the available funding is channelled into 14 National Priority Areas, which have little overlap with our research. Area A [Future Networks and Communications] might come close if quantum information were included, and some of our related research has relevance for non-abelian anyons and topological insulators, thus the 'Novel Materials' part of area M [Processing Technologies and Novel Materials]. The 14 areas aim at short-term economic benefit, however. The funding programmes of Science Foundation Ireland concern the 14 areas of 'any area under SFI's legal remit where strong evidence can be provided of significant industrial relevance and strong economic impact'.

## 1. Staff and Associates

STP comprises of three senior professors [T. Dorlas, W. Nahm, D. O'Connor]. Until 2014 the research staff of the School also included three Schrödinger fellows, but this was cut to two. Two of the three Schrödinger fellows had ended their term in 2013, Stefano Kovacs in early 2014. He was replaced by Graham Kells on 1.5.2014. The second newly appointed Schrödinger fellow, Leron Borsten had asked for a late start in January 2015. In view of our financial situation this corresponded to our interests and was granted. For 2014 it left us with a reduced research staff, however. Our scholar positions were used for both postdoc [M. Beau, B. Savoie and M. Leitner] and predoc students [T. Kaltenbrunner, O. Smits and M. Vachowski]. The latter finished their studies and obtained their PhDs in 2014. The research staff was supplemented by one scholar financed by IRCSET [V. Filev, at STP since 2012].



*Professor Freeman Dyson, Institute for Advanced Study, Princeton, presented the '2014 Statutory Public Lecture' of the School of Theoretical Physics May 2014.*

*Thug an tOllamh Freeman Dyson, Institiúid Ard-Léinn, Princeton an Léacht Reachtúil Phoiblí 2014 Scoil na Físice Teoiriciúla Bealtaine 2014.*

For many of our associates DIAS has provided a suitable environment for advancing their research. Since his retirement T. Tchrakian works here, C. Nash [NUIM] comes often and on a regular basis. B. Dolan works with Denjoe O'Connor's group and was very active in our journal club, e.g. concerning the search for dark matter and the status of supersymmetry, but he moved to Edinburgh for most of the year.

Secretarial tasks were split between the librarian and a secretary of the administration. This is not an ideal solution, but it works. Library and IT support is satisfactory.

## 2. Research

D.O'Connor's main research interests are fuzzy geometries, matrix models and the emergence of geometry in phase transitions.

Along with our IRCSET fellow V. Filev, D.O'Connor wrote two papers on Commuting Quantum Matrix Models. In the first one, 'On the Phase Structure of Commuting Matrix Models' they analyzed models with quadratic and quartic potentials and found that the physics of these systems depends crucially on the number  $p$  of matrices. For  $p$  at most 4 there is a phase transition with topology change when the matrices are large. For greater  $p$  the system is always in the topologically non-trivial phase.

# Scoil na Fíisce Teoiriciúla

De réir Acht DIAS agus Ordú Bunaithe Scoil na Fíisce Teoiriciúla 1940 is iad na dualgais atá againn ná taighde a dhéanamh agus a fhoilsiú ar phrionsabail mhatamaiticiúla na fealsúnachta nádúrtha agus cur i bhfeidhm na bprionsabal sin ar an bhfísic [lena n-áirítear an chosmeolaíocht], oiliúint ar mhic léinn iarchéime, áiseanna a sholáthar d'ollúna agus léachtóirí ollscoile ar shaoire neamhláithreachta óna ndualgais acadúla, agus seimineáir, comhdhálacha agus léachtaí a eagrú. Ní mór go n-áireodh na léachtaí léacht phoiblí reachtúil bhliantúil sa Choláiste Ollscoile, Baile Átha Cliath nó Coláiste na Tríonóide, Baile Átha Cliath.

Sa bhliain 1940 ní raibh ollscoileanna na hÉireann ábalta fós na feidhmeanna seo a chur i gcrích ar bhonn sásúil. Tá athrú tagtha ar an scéal ó shin, ach tá srianta i bhfad níos nó ar thaighdeoirí ollscoile mar thoradh ar dhualgais eile agus brúnna airgeadais. Tá DIAS níos inchomparáide le hinstitiúidí taighde amháil Princeton IAS [an múnla do DIAS] agus Institiúidí Max Planck. Cuirtear formhór an mhaoinithe atá ar fáil isteach i 14 Limistéar Tosaíochta Náisiúnta, nach bhfuil ach forluí beag acu lenár dtaighde. D'fhéadfadh Limistéar A [Líonraí agus Cumarsáid sa Todhchaí] a bheith cóngarach dá mbeadh faisnéis candamach san áireamh, agus tá cuid d'ár dtaighde gaolmhar ábhartha do *anyons* neamh-aibéalacha agus inslitheoirí toipeolaíochta, mar sin an chuid 'Ábhair Núíosacha' de limistéar M [Teicneolaíochtaí Próiseála agus Ábhair Núíosacha]. Tá na 14 limistéar dírithe ar leas eacnamaíoch gearrthéarma, áfach. Baineann cláir mhaoinithe Fhondúireacht Eolaíochta Éireann [SFI] leis na 14 limistéar 'd'aon limistéar faoi shainordú dlíthiúil SFI áit is féidir fianaise láidir a sholáthar ar ábharthacht thionsclaíoch shuntasach agus tionchar eacnamaíoch láidir'.

## 1. Foireann agus Comhaltaí

I Scoil na Fíisce Teoiriciúla tá triúr ollúna sinsearach [T. Dorlas, W. Nahm, D. O'Connor]. Go dtí 2014 bhí triúr comhaltaí Schrödinger ar fhoireann taighde na Scoile freisin, ach gearradh an líon seo go dtí beirt. Bhí a dtéarma críochnaithe ag beirt de na comhaltaí Schrödinger sa bhliain 2013, agus ag Stefano Kovacs go luath sa bhliain 2014. Tháinig Graham Kells san ionad air an 1.5.2014. Lorg an dara comhalta Schrödinger nuacheaptha, Leron Borsten, tosach déanach in Eanáir na bliana 2015. I bhfianaise ár staide airgeadais bhí sé seo ag teacht lenár leasa agus deonadh é. Fágadh foireann taighde laghdaithe againn don bhliain 2014, áfach. Baineadh úsáid as ár bpoist scoláire do mhic léinn iardhochtúireachta [M. Beau, B. Savoie agus M. Leitner] agus réamhdhochtúireachta [T. Kaltenbrunner, O. Smits agus M. Vachovski] araon. Chríochnaigh an triúr deireanach sin a staidéar agus bhain siad a gcéimeanna PhD amach i 2014. Cuireadh leis an

bhfoireann taighde ag scoláire amháin maoinithe ag IRCSET [V. Filev, atá i Scoil na Fíisce Teoiriciúla ó 2012].

Do neart d'ár gcomhaltaí chuir DIAS timpeallach oiriúnach ar fáil chun a dtaighde a chur chun cinn. I ndiaidh dó dul ar scor oibríonn T. Tchrakian anseo, tagann C. Nash [OÉM] go minic agus ar bhonn rialta, oibríonn B. Dolan le grúpa Denjoe agus bhí sé an-ghníomhach inár gcumann irise, m.sh. maidir leis an gcuardach ar dhamhna dorcha agus stádas na sárshiméadrachta, ach bhog sé go Dún Éideann d'fhormhór na bliana.

Roinneadh tascanna rúnaíochta idir an leabharlannaí agus rúnaí de chuid an riaracháin. Ní hé seo an réiteach is fearr, ach oibríonn sé. Tá tacaíocht leabharlainne agus teicneolaíochta faisnéise sásúil.

## 2. Taighde

Is iad na príomhábhair taighde ag D. O'Connor ná geoiméadrachtaí doiléire, samhla maitrise agus teacht chun cinn na geoiméadrachta i bpas-trasdulta.

Lenár gcomhalta IRCSET V. Filev scríobh sé dhá pháipéar ar Shamhlacha Maitrise Candamacha Timaistrithe. Sa chéad cheann, 'On the Phase Structure of Commuting Matrix Models' rinne siad anailís ar shamhlacha le poitéinsil chuadratacha agus chuartacha agus fuair siad amach go mbíonn físic na gcóras sin ag brath go rithábhachtach ar líon  $p$  na maitrisí. I gcásanna ina bhfuil  $p$  cothrom le 4 ar a mhéad, bíonn pas-trasdul le hathrú toipeolaíochta ann nuair a bhíonn na maitrisí mór. Maidir le cásanna i bhfuil  $p$  níos mó, bíonn an córas i gcónaí sa chéim toipeolaíochta neamh-bheagbhríoch. Rinneadh an obair anailíse sa treo seo a dhearbhu ag ionsamhluithe uimhriúla ríomhaire. Foilsíodh an páipéar i JHEP 1408 (2014) 003.

Sa dara páipéar, 'Commuting Quantum Matrix Models', arxiv:1408.1388, rinne siad staidéar ar ab gcoinníoll faoinar féidir le córas dá leithéid de mhaitrisí timaistrithe  $p$  bunstaid fuinnimh chríochna a bheith acu. Sa foirmliú Lagrangian, tharla go bhfuil gá le poitéinseal léir cuaire-spleách, ach sa foirmliú Hamilton is féidir é seo a sheachaint. Le go mbeadh geoiméadracht ag teacht chun cinn ann, ní mór dual-luachanna srianta go géar a bheith ann nuair atá méid mór ag na maitrisí. Arís, tharla go raibh an luach  $p=4$  rithábhachtach. Fuair na húdair amach go mbíonn na dual-luachanna srianta do sceall sféarach nuair a bhíonn  $p$  ar a laghad 4, ach nach mbíonn do líon níos lú maitrisí. Cuireadh an páipéar isteach do JHEP.



The analytic work in this direction was confirmed by numerical computer simulations. The paper was published in JHEP 1408 [2014] 003.

In the second paper, 'Commuting Quantum Matrix Models', arxiv:1408.1388, they studied the condition under which such a system of  $p$  commuting matrices can have a finite energy ground state. In the Lagrangian formalism it turned out that one needs an explicit curvature dependent potential, but in the Hamilton formalism this can be avoided. To have an emerging geometry one needs sharply constrained eigenvalues when the matrices have large size. Again the value  $p=4$  turned out to be critical. The authors found that the eigenvalues are constrained to a spherical shell when  $p$  is at least 4, but not for fewer matrices. The paper was submitted to JHEP.

There were four papers published by V. Filev which study quarks and mesons in supersymmetric theories using holographic duality. The paper 'Flavours in global Klebanov-Witten background' was written in the last days of 2013 and included in the 2013 STP report. It was published in JHEP 1403 [2014] 023.

Among three of the papers, two study mesons on a sphere under the influence of a large magnetic field. The first 'Holographic Bilayer/Monolayer Phase Transitions' was written with D. Zoakos [in Porto] and our former IRCSET fellow M. Ihl, [now also in Porto]. The gravity dual of the theory was obtained by a suitable embedding of 5-dimensional flavour branes. An analysis of the meson spectrum confirmed the stability of the confining bilayer solution. The paper was published in JHEP 1407 [2014] 043. The second paper, 'A Quantum Critical Point from Flavours on a Compact Space' looked in more detail at the phase diagram of the model. Though there is no deconfining phase once a magnetic field is present, there is a first order phase transition of a different type, with a second order phase transition at the end of the corresponding line in the phase diagram. Critical exponents were evaluated. The study of the magnetisation uncovered a persistent diamagnetic response similar to that in mesoscopic systems, such as quantum dots and nano-tubes. The paper was published in JHEP 1408 [2014] 105.

The fourth paper introduced a novel supergravity background holographically dual to the flavoured  $N=1$  Supersymmetric Yang-Mills theory. Quark masses are described in terms of spherical cavities with radii proportional to the masses.

An interesting feature of the model is the screening of the interaction between heavy and light quarks. The paper was published in JHEP 1412 [2014] 186.

T. Dorlas main research interests are quantum information and aspects of quantum mechanics related to path integrals. A fundamental result in quantum information theory was J. Bell's inequalities published 50 years ago. Dorlas discussed the present status of the research in 'Bell's inequalities, 50 years later, DIAS-STP-1406. Along with his postdoc student M. Beau he published a new version of 'Quantum slit diffraction in space and in time of a Gaussian wave packet and semi-classical approximation' [June 2014] with more detailed calculations for the experimental observability of quantum fluctuations. At present the task would be very challenging, but future advances in technology may change that. Also with M. Beau he wrote 'Three-dimensional Quantum Slit Diffraction and Diffraction in Time', DIAS-STP-1404. In this research, reflecting screens with arbitrary aperture are investigated, in particular with regard to the quantum nature of the motion perpendicular to the screen and the presence of gravity. The paper was accepted by the International Journal of Theoretical Physics.

Together the two postdocs M. Beau and B. Savoie published two papers. In 'Rigorous investigation of the reduced density matrix for the ideal Bose gas in harmonic traps by a loop-gas-like approach' they investigated the reduced density matrix associated to the ideal Bose gas in harmonic traps by an appropriate decomposition. For isotropic traps this reproduces known results, but for anisotropic traps it opens new territory, in particular for the study of quasi-one- and two-dimensional regimes. The results can guide numerical investigations on highly anisotropic systems based on the Path Integral Monte Carlo method. The paper was published in J.Math.Phys. 55 [2014] 053301. In 'Gaussian decay for a difference of traces of the Schrödinger semigroup associated to the isotropic harmonic oscillator' they gave sharp estimates for the trace difference, with an application within the framework of quantum statistical mechanics. The paper was published in J. Math. Anal. Appl. 419 [2014] 1095.

In Professor Werner Nahm's group, the paper 'Membranes from monopole operators in ABJM theory: Large angular momentum and M-theoretic  $AdS_4/CFT_3$ ' by S. Kovacs and collaborators was published in PTEP 2014 [2014] 093B01. This paper realises the first test of  $AdS/CFT$  duality in a region where membrane degrees of freedom are important.

Foilsíodh ceithre pháipéar le V. Filev ina ndéantar staidéar ar chuairc agus méasóin i dteoiricí sárshiméadracha ag baint úsáide as déacht holografach. Scríobhadh an páipéar 'Flavours in global Klebanov-Witten background' sna laethanta deiridh de 2013 agus cuireadh san áireamh é i dtuairisc 2013 ó Scoil na Fisice Teoiriciúla. Foilsíodh é i JHEP 1403 [2014] 023.

I measc trí cinn de na páipéir, déantar staidéar i ndá cheann acu ar mhéasóin ar sféar faoi thionchar ag réimse mhaighnéadach mhór. Scríobhadh an chéad cheann acu, 'Holographic Bilayer/Monolayer Phase Transitions' le D. Zoakos i Porto agus ár n-iarchomhalta IRCSET M. Ihl, atá lonnaithe i Porto anois freisin. Baintear déacht domhantarraingthe na teoirice amach trí neadú cuí ar bhráiní blaise 5-thoiseach. Le hainilís ar an speictream méasóin dearbhaíodh seasmhacht an réitigh déchisil gaibhniúcháin. Foilsíodh an páipéar i JHEP 1407 [2014] 043. Sa dara páipéar, 'A Quantum Critical Point from Flavours on a Compact Space' féachadh níos mine ar phasléaráid na samhlach. Cé nach bhfuil aon chéim díshainmhínte nuair a bhíonn réimse mhaighnéadach i láthair, tá pas-trasdul céadoidr de chineál éagsúil ann, le pas-trasdul dara oird ag deireadh na líne comhfhereagraí sa phasléaráid. Rinneadh meastóireacht ar easpónaint chriticiúla. Sa staidéar ar an maignéadacht, nochtaiódh freagra diansheasmhach diamaighnéadach cosúil leis sin i gcórais mhéasascópacha, amhail poncanna candamacha agus nana-fheadáin. Foilsíodh an páipéar i JHEP 1408 [2014] 105.

Sa cheathrú páipéar cuireadh i láthair cúla sár-dhomhantarraingte núiosach déach go holografach leis an teoiric Shárshiméadrach bhlasta  $N=1$  Yang-Mills. Tugtar cur síos ar mhaiseanna cuairc i dtéarmaí cuas sféaracha le gathanna comhréireach leis na maiseanna. Gné shuimiúil den tsamhail is ea scáileadh na hidrighníomhaíochta idir chuairc throma agus éadroma. Foilsíodh an páipéar i JHEP 1412 [2014] 186.

Is iad na príomhábhair taighde ag T. Dorlas ná faisnéis chandamach agus gnéithe de mheicnic chandamach a bhaineann le suimeálaithe conaire. Toradh bunúsach i dteoiric na faisnéise candamaí ab ea éagothromóidí J. Bell a foilsíodh 50 bliain ó shin. Phléigh Dorlas stádas reatha an taighde i 'Bell's inequalities, 50 years later', DIAS-STP-1406. Lena mhac léinn iardhochtúireachta M. Beau d'fhoilsigh sé leagan nua de 'Quantum slit diffraction in space and in time of a Gaussian wave packet and semi-classical approximation' [Meitheamh 2014] le ríomhanna níos mionsonraithe d'ínbheathnaitheacht thurgnamhach ar iomlaoidí candamacha. Faoi láthair bheadh an-dúshlán ag baint le tasc dá leithéid, ach b'fhéidir go n-athróidh an scéal mar

thoradh ar an dul chun cinn sa teicneolaíocht amach anseo. In éineacht le M. Beau freisin scríobh sé 'Three-dimensional Quantum Slit Diffraction and Diffraction in Time', DIAS-STP-1404. Ansin déantar fiosrú faoi scáileáin fhrithchaiteacha le cró treallach, ach go háirithe maidir le nádúr cantamach na gluaiseachta ingearach don scáiléan agus láithreach na domhantarraingte. Ghlac an International Journal of Theoretical Physics leis an bpáipéar.



*The RIA Gold Medals are awarded to two outstanding academics each year and are recognised as a truly national expression of celebration for scholarly achievement. The 2014 RIA Gold Medals were awarded by Minister Jan O'Sullivan at a special ceremony in the RIA, Dublin, [Tuesday January 27, 2015]. The medals are sponsored by The Higher Education Authority, and the Gold Medal for the Humanities was awarded to Desmond Clarke, Professor [emeritus] of Philosophy at University College Cork.*

*Bronntar na Boinn Óir RIA ar bheirt sár acadóirí gach bliain agus aithnítear iad mar cheiliúradh náisiúnta ar éacht scolártha. Bhronn an tAire Jan O'Sullivan na Boinn Óir RIA 2014 ag searmanas speisialta san RIA, Baile Átha Cliath, [Dé Máirt 27 Eanáir 2015]. Déanann an tÚdarás um Ard-Oideachas urraíocht ar na boinn, agus bronnadh an Bonn Óir sna Daonnachtaí ar Desmond Clarke, Ollamh [emeritus] Fealsúnachta ag Coláiste na hOllscoile Corcaigh.*

Previously only BPS or superstring observables could be tested. In view of the importance and high quality of this research it is very regrettable that Kovacs could not find a position in Ireland.

G. Kells wrote 'Many-body Majorana operators and the unitary equivalence of parity sectors', arxiv 1409.6575. He investigated one-dimensional p-wave topological superconductors and showed that the degeneracy of states with opposite parity cannot be lifted by local interactions except for very short wires. The derivation of this result carries over to the experimentally relevant cases.

A paper published by G. Kells on 'Kitaev spin models from topological nanowires networks' concerns the possibility to use such networks for quantum computation in the context of Kitaev's spin model. The author found that the spin model with two-body interactions can indeed be realized by the network. The paper was published in Phys.Rev. B89 [2014] 7, 075122.

Cormac O'Raiheartaigh, Brendan McCann, W. Nahm and S. Mitton published 'Einstein's steady-state theory: an abandoned model of the cosmos', European Physical Journal H 39 [2014] 353. The paper discusses an unpublished manuscript by Einstein in which he attempted to construct a 'steady-state' model of the universe, anticipating the later steady-state cosmology of Hoyle, Bondi and Gold in some ways. The paper got much international media attention.

M. Leitner obtained her PhD in mathematics [her second PhD after the one in physics]. Her TCD thesis on 'CFTs on Riemann Surfaces of genus  $g>1$ ' was put online. In May 2014 new results on the partition functions in higher genus were incorporated in 'CFTs on Riemann Surfaces of genus  $g>1$ : Dependence on moduli', version 3 of arxiv 1305.0469, with W Nahm. The new version contains more than twice the material than the 2013 versions. The major problem arising in 2013 was solved by a better understanding of the operator product expansions of the ramifications which arise for mappings to projective space. When two of these points get close, one finds regular singular points in our differential equations with rather unusual properties, namely high degeneracy of the critical indices but no logarithms. We had expected the degeneracies to increase like powers of 2 when the genus is increased, but found Fibonacci numbers. Since the work is intended for a leading mathematics journal, it still needs better axiomatic foundations, to be provided in 2015.

With F. Laytimi, Nahm worked out vanishing conditions for Schur functors of ample vector bundles which are generated by sections. In most cases one finds stronger results than in the case where the latter condition is omitted. This provides essential sign-posts for the search of optimal vanishing theorems. The results have not yet been written up for lack of time. The paper 'Generation by sections and k-ampleness' was accepted by Journal of Algebra.

With the assyriologist D. Lacambre, Lille, Nahm worked on the paper 'Pithana, an Anatolian ruler in the time of Samsuiluna of Babylon. New data from Tell Rimah', is to be published in 2015. Based on a seal from the Syrian Site of Tell Rimah the authors showed that Anatolian influence on Northern Mesopotamia started a century earlier than what had been known so far, with important consequences for the chronology of the second millennium BC. As a side product, Nahm corrected the reading of a cuneiform tablet found at Tell Rimah, which yields a better understanding of the geography of the kingdom in the late Old Babylonian period. 'Marhatan in Oldbabylonian Tell Rimah' was published in NABU, Dec. 2014, 128.

The PhD work of O. Smits was incorporated in the paper 'Non-equilibrium noise in the (non-)Abelian fractional quantum Hall effect' by W. Nahm, J. Slingerland and S. Simon, arXiv:1401.4581.

### 3. Conferences and lectures

The 2014 Statutory Public Lecture of the School of Theoretical Physics was given by Professor Freeman Dyson [Institute for Advanced Study, Princeton]. The lecture was held in UCD on Monday 19th May and was entitled "Are Brains Analog or Digital?"

It found much public interest. In view of personal contact going back to the stay of the Dublin physicist Sheila Power at Princeton in 1948-49, her son Hugh Tinney gave a piano performance for Dyson.

Our School supported the 2014 conference on Irish Quantum Foundations, 30-31 May, which in this year took place at TCD.

G. Kells gave a talk on Topological blocking in quantum quench dynamics and W. Nahm gave the concluding summary talk of the meeting.

On 27 May, W. Nahm gave the RIA Academy Discourse on 'The Date of Hammurabi', based on his interdisciplinary research on Mesopotamian chronology.

In éineacht lena chéile, d'fhoilsigh an bheirt mhac léinn iardhochtúireachta M. Beau agus B. Savoie dhá pháipéar. Sa pháipéar 'Rigorous investigation of the reduced density matrix for the ideal Bose gas in harmonic traps by a loop-gas-like approach' d'fhiosraigh siad an mhaitris ar dhlús laghdaithe a ghabhann leis an ngás Bose idéalach i dtrappedanna armónacha faoi dhianscaoileadh cuí. Maidir le trappedanna iseatrópacha athchruthaíonn sé seo torthaí atá ar eolas, ach maidir le trappedanna ainiseatrópacha osclaíonn sé réimse nua, ach go háirithe don staidéar ar réimis aon-toiseacha agus dé-toiseacha shamhlacha. Féadfaidh na torthaí treoir a thabhairt d'fhiosruithe uimhríúla ar chórais ard-ainiseatrópacha bunaithe ar an gcóras suimeálaithe conaire Monte Carlo. Foilsíodh an páipéar i J. Math. Phys. 55 [2014] 053301. Sa pháipéar 'Gaussian decay for a difference of traces of the Schrödinger semigroup associated to the isotropic harmonic oscillator' thug siad meastacháin ghéara don difear rianta, le eidhmiú laistigh de chreat na meicnice candamaí staidrimh. Foilsíodh an páipéar i J. Math. Anal. Appl. 419 [2014] 1095.

I ngrúpa Nahm, foilsíodh an páipéar 'Membranes from monopole operators in ABJM theory: Large angular momentum and M-theoretic  $AdS_4/CFT_3$ ', le S. Kovacs agus comhoibrithe, i PTEP 2014 [2014] 093B01. Sa pháipéar seo réadaítear an chéad tástáil ar dhéacht  $AdS/CFT$  i réigiún ina bhfuil céimeanna saoirse scannáin tábhachtach. Roimhe seo ní fhéadfaí ach inbhreathnaithigh BPS nó sártheaghráin a thástáil. I bhfianaise tábhacht agus ardcháilíocht an taighde seo is trua go mór nach raibh Kovacs in ann post a aimsiú in Éirinn.

Scríobh G. Kells 'Many-body Majorana operators and the unitary equivalence of parity sectors', arxiv 1409.6575. D'fhiosraigh sé forsheoltóirí toipeolaíocha aontoiseacha agus léirigh sé nach féidir le díchineálacht de staidéanna ar phaireacht mhalartach a ardú le hidirghníomhaíochtaí áitiúla ach amháin do shreangáin an-ghearra. Leantar le díorthú an toraidh seo chuig na cásanna ábhartha turgnaimh.

Baineann páipéar a d'fhoilsigh G. Kells maidir le 'Kitaev spin models from topological nanowires networks' leis an bhféidearthacht go mbainfí úsáid as líonraí dá leithéid do ríomh candamach i gcomhthéacs na samhlach rothlaithe Kitaev. Fuair an t-údar amach gur féidir go deimhin an tsamhail rothlaithe le hidirghníomhaíochtaí dhá réad a réadú ag an líonra. Foilsíodh an páipéar i Phys. Rev. B 89 [2014] 7, 075122.

D'fhoilsigh Cormac Ó Raifeartaigh, Brendan McCann, W. Nahm agus S. Mitton 'Einstein's steady-state theory: an abandoned model of the cosmos', European Physical Journal H 39 [2014]

353. Pléann an páipéar lámhscríbhinn neamhfhoilsithe le Einstein ina rinne sé iarracht samhail 'fhoistine' den chruinne a chruthú, ag déanamh amach roimh ré an chosmeolaíocht fhoistine níos déanaí de chuid Hoyle, Bondi agus Gold ar roinnt bealaí. Tharraing an páipéar neart aird ó na meáin idirnáisiúnta.

Bhain M. Leitner amach a céim PhD sa mhatamaitic (a dara céim PhD i ndiaidh an chinn san fhisic). Cuireadh a tráchtas do Choláiste na Tríonóide, Báile Átha Cliath ar 'CFTs on Riemann Surfaces of genus  $g>1$ ' ar líne. I mBealtaine na bliana 2014 cuireadh torthaí nua maidir leis na feidhmeanna deighleora in ard-ghéineas san áireamh i 'CFTs on Riemann Surfaces of genus  $g>1$ : Dependence on moduli', leagan 3 de arxiv 1305.0469, le W. Nahm. Sa leagan nua tá níos mó ná dhá oiread an ábhair ná mar a bhí i leaganacha 2013. Réitíodh an phríomhfhadhb a tháinig chun cinn i 2013 trí thuiscint níos fearr ar fhorbairtí táirge oibrí na n-iarmhairtí a éiríonn do mhapálacha do spás teilgeach. Nuair a théann dhá cheann de na pointí sin i gcógar, aimsíonn ceann amháin pointí aonair rialta inár gcothromóidí difreálacha le hairíonna atá cineál neamhghnách, is é sin díchineálacht ard de na hinnéacsanna criticiúla ach gan logartam. Cheapamar go méadóidh na díchineálachtaí amhail cumhachtaí 2 nuair a mhéadaítear an géineas, ach d'aimsíomar uimhreacha Fibonacci. Toisc go bhfuil sé beartaithe an obair a fhoilsiú i mór-iris matamaitice, tá gá aici le boinn aicsímeacha níos fearr, atá le soláthar i 2015.

In éineacht le F. Laytimi, d'oibrigh Nahm amach coinníollacha téaltaithe d'fheidhmeoirí Schur de chuail veicteora imleor a ghintear ag codanna. I bhformhór na gcásanna aimsítear torthaí níos láidre ná sa chás ina bhfágatar an choinníoll deireanach ar lár. Soláthraíonn sé seo treoracha bunúsacha don chuardach ar theoirimí téaltaithe optamacha. Níl na torthaí scríofa suas go fóill de cheal ama. Ghlac an Journal of Algebra leis an bpáipéar 'Generation by sections and k-ampleness'.

In éineacht leis an saineolaí ar an Aisiria D. Lacambre, Lille, d'oibrigh Nahm ar an bpáipéar 'Pithana, an Anatolian ruler in the time of Samsuiluna of Babylon. New data from Tell Rimah', atá le foilsiú i 2015. Bunaithe ar shéala ón suíomh Siríach, Tell Rimah, léirigh na húdair gur thosaigh tionchar Anatólach ar Thuaisceart na Measpatáime céad bliain níos luaithe ná mar a bhí ar eolas go dtí seo, le torthaí tábhachtacha do chroineolaíocht na dara mílaoise BC. Mar tháirge taoibh, cheartaigh Nahm an léamh de tháibléad dingchruthach a fuarthas ag Tell Rimah, a thugann tuiscint níos fearr de threolaíocht na ríochta sa ré Sean-Bhablónach déanach. Foilsíodh 'Marhatan in Oldbabylonian Tell Rimah' i NABU, Dec. 2014, 128.

A Workshop on Nano-Science and Quantum Matter in Low Dimensions took place at DIAS from 10th to 12th November. The meeting was organized jointly by DIAS and Maynooth University. The aim of the workshop was to bring together leading scientists in nano-science, condensed matter and quantum information with a view to fostering interdisciplinary communication and collaboration.

### **4. Recognition**

Professor Werner Nahm, received the RIA 2014 Gold Medal for Physical and Mathematical Sciences. In recognising his work the Academy commented that through his pioneering research, he has contributed substantially to a wide range of fields but especially mathematical physics. The Academy also commented that Professor Werner Nahm is exceptional for his deep insight into the mathematical structures underlying quantum field theory. He is described as a genuine polymath and recently brought his unique combination of mathematical, linguistic and astronomical knowledge to bear on the question of the precise dating of Assyrian chronology, with important implications for the chronology of the Middle East and studies of historical climate change.



Ionchorpraíodh saothar PhD de chuid O. Smits sa pháipéar 'Non-equilibrium noise in the (non-) Abelian fractional quantum Hall effect' leis féin, J. Slingerland agus S. Simon, arXiv:1401.4581.

### 3. Comhdhálacha agus léachtaí

Ba é an tOllamh Freeman Dyson (Institute for Advanced Study, Princeton) a thug Léacht Phoiblí Reachtúil Scoil na Fisice Teoiriciúla 2014. Tugadh an léacht sa Choláiste Ollscoile, Baile Átha Cliath Dé Luain an 19 Bealtaine agus ba é "Are Brains Analog or Digital?" an teideal a bhí uirthi. Spreag sí neart suime poiblí. I bhfianaise na teagmhála pearsanta ag dul siar go cuairt an fhisiceora Sheila Power as Baile Átha Cliath ag Princeton i 1948-49, thug a mac Hugh Tinney ceolchoirm ar an bpianó do Dyson.

Thug ár Scoil tacaíocht do chomhdháil na bliana 2014 ar Bhoinn Chandamacha Éireannacha, 30-31 Bealtaine, a bhí ann i mbliana i gColáiste na Tríonóide, Baile Átha Cliath.

Thug G. Kells caint ar bhlocáil thoipeolaíoch i ndinimic fuaraithe chandamach agus thug W. Nahm an chaint deiridh achoimre den chruinniú.

An 27 Bealtaine, thug W. Nahm Aitheasc Acadaimh de chuid Acadamh Ríoga na hÉireann ar 'The Date of Hammurabi', bunaiteh ar a thaighde idirdhisciplíneach ar chroineolaíocht na Measpatáime.

Bhí ceardlann ar Naineolaíocht agus Ábhar Candamach i nDiminsin Ísle ar bun ag DIAS ón 10 go 12 Samhain. B'iad DIAS agus Ollscoil Mhá Nuad a chomheagraigh an cruinniú. Ba í aidhm na ceardlainne ná eolaithe is tuisce sa naineolaíocht, san ábhar comhdhlúite agus san fhaisnéis chandamach a thabhairt le chéile d'fhonn cumarsáid agus comhoibriú idirdhisciplíneach a chur chun cinn.

### 4. Aitheantas

Bhain an tOllamh Werner Nahm Bonn Óir Acadamh Ríoga na hÉireann 2014 do na hEolaíochtaí Fisiceacha agus Matamaitice amach. Agus aitheantas á thabhairt dá shaothar, dúirt an tAcadamh, gurb amhlaidh, trína thaighde ceannródaíoch, gur chuir sé go mór le raon leathan de réimsí ach go háirithe don fhisic mhatamaiticiúil. Dúirt an tAcadamh freisin go bhfuil an tOllamh Werner Nahm eisceachtúil as a léargas domhain ar na struchtúir mhatamaiticiúla atá mar bhunús le teoiric réimse chandamach. Tugtar fíor-ileolaí air agus le déanaí chuir sé a mheascán uathúil d'eolas matamaiticiúil, teangeolaíoch agus réalteolaíoch i bhfeidhm ar an gceist maidir le dátú cruinn Chróineolaíocht na hAisirí, le torthaí tábhachtacha do chroineolaíocht an Mheán-Oirthir agus staidéar ar athrú aeráide stairiúil.

## PUBLICATIONS 2014

### Papers published in refereed journals

1. O’Raifeartaigh, C., McCann, B., **Nahm, W.** and Mitton, S. [2014] “Einstein’s steady-state theory: an abandoned model of the cosmos”, *Eur. Phys. J. H*, 39, 353.
2. Datta, N., **Dorlas, T. C.**, Jozsa, R. and Benatti, F. [2014] “Properties of subentropy”, *J. Math. Phys.*, 55, 062203.
3. **Filev, V. G.** and **O’Connor, D.** [2014] “On the Phase Structure of Commuting Matrix Models”, *JHEP*, 1408, 003.
4. **Beau, M.** and **Savoie, B.** [2014] “A rigorous investigation of the reduced density matrix for the Bose gas in harmonic traps: a loop-gas-like approach”, *J. Math. Phys.*, 55, 053301.
5. **Beau, M.** and **Savoie, B.** [2014] “Gaussian decay for a difference of traces of the Schrödinger semigroup associated to the isotropic harmonic oscillator”, *J. Math. Anal. Appl.*, 419, 1095–1118.
6. **Filev, V. G.** and Zoakos, D. [2014] “Multiple backreacted flavour branes”, *JHEP*, 1412, 186.
7. **Filev, V. G.** [2014] “A quantum critical point from flavours on a compact space”, *JHEP*, 1408, 105.
8. **Filev, V. G.**, Ihl, M. and Zoakos, D. [2014] “Holographic Bilayer/Monolayer phase transitions”, *JHEP*, 1407, 043.
9. Arnaudov, D., **Filev, V. G.** and Rashkov, R. [2014] “Flavours in global Klebanov-Witten background”, *JHEP*, 1403, 023.
10. **Kovacs, S.**, Sato, Y. and Shimada, H. [2014] “Membranes from monopole operators in ABJM theory: large angular momentum and M-theoretic AdS<sub>4</sub>/CFT<sub>3</sub>”, *Prog. Theor. Exp. Phys.*, 093B01.
11. **Kells, G.**, Slingerland, J., Sen, D. and Vishveshwara, S. [2014] “Topological blocking in quantum quench dynamics”, *Phys. Rev. B*, 89, 23, 235130.
12. **Kells, G.**, Lahtinen, V. and Vala, J. [2014] “Kitaev spin models from topological nanowire networks”, *Phys. Rev. B*, 89, 7, 075122.
13. **Dolan, B. P.** [2014] “The compressibility of rotating black holes in D-dimensions”, *Class. Quantum Grav.*, 31, 035022.
14. Navarro-Lerida, F., Radu, E. and **Tchrakian, D. H.** [2014] “A Chern-Simons-Yang-Mills-Higgs system in 3+1 dimensions”, *Int. J. Mod. Phys. A*, 29, 26, 1450149.
15. Navarro-Lerida, F., Radu, E. and **Tchrakian, D. H.** [2014] “Generalized dyons and magnetic dipoles: the issue of angular momentum”, *Phys. Rev. D*, 90, 6, 064023.

### Papers published in conference proceedings and edited works

1. **Dolan, B. P.** [2014] “Black holes, the van der Waals gas, compressibility and the speed of sound”: Talk presented at the 13th Hellenic School and Workshops on Elementary Particle Physics and Gravity, 31 Aug.–15 Sep. 2013, Corfu, Greece. *Fortschritte der Physik*, 62, 892.
2. Radu, E. and **Tchrakian, D. H.** [2014] “Abelian and non-Abelian Hopfions in all odd dimensions”, *J. Phys. Conf.*, 544, 1, 012024.

### Preprints [unpublished articles]

1. **Beau, M.** and **Savoie, B.** [2014] "Rigorous investigation of the reduced density matrix for the ideal Bose gas in harmonic traps by a loop-gas-like approach".
2. **Beau, M.** and **Savoie, B.** [2014] "Gaussian decay for a difference of traces of the Schrödinger semigroup associated to the isotropic harmonic oscillator".
3. **Filev, V.** and **O'Connor, D.** [2014] "On the phase structure of commuting matrix models".
4. **Beau, M.** and **Dorlas, T. C.** [2014] "Three-dimensional quantum slit diffraction and diffraction in time".
5. McCann, B., Mitton, S., **Nahm W.** and O'Raifeartaigh, C. [2014] "Einstein's exploration of a steady-state model of the universe".
6. **Dorlas, T. C.** [2014] "Bell's inequalities, 50 years later".
7. **Filev, V., Ihl, M.** and Zoakos, D. [2014] "Holographic bilayer/monolayer phase transitions".
8. **Filev, V.** [2014] "A quantum critical point from flavours on a compact space".
9. **Filev, V.** and **O'Connor, D.** [2014] "Commuting quantum matrix models".
10. **Kells, G.** [2014] "Many-body Majorana operators and the equivalence of parity sectors".
11. **Filev, V.** and Zoakos, D. [2014] "Multiple backreacted flavour branes".
12. **Savoie, B.** [2014] "A rigorous proof of the Bohr-van Leeuwen theorem in the semiclassical limit".
13. Navarro-Lerida, F. and **Tchrakian, D. H.** [2014] "Electrically charged finite energy solutions of an  $SO(5)$  and an  $SU(3)$  Higgs-Chern-Simons--Yang-Mills-Higgs systems in 3+1 dimensions".
14. Navarro-Lerida, F., Rada, E. and **Tchrakin, D. H.** [2014] "Generalised dyons and magnetic dipoles: the issue of angular momentum".

# Administration and Finance

The terms of the Haddington Road Agreement were implemented for all staff. The increase in working hours is being implemented on a phased basis. Recruitment restrictions coupled with further cuts in the Pay Grant continue to present difficulties in filling key posts. There is also growing pressure on administrative and technical support services. Staff co-operated fully with the introduction of new standardised leave arrangements and other measures aimed at minimising the impact of staffing reductions.

With the help of an external PR adviser, steps were taken during the year to better promote the work of DIAS and to enhance public engagement. This resulted in better publicity with coverage of a number of events during the year in the national media.

A review of fire safety systems commenced at the end of the year which has identified urgent measures required to upgrade the fire safety system at the Burlington Road site. A plan is currently being developed to address this.

## Finance

The attached financial statements report a profit of €200,589 for the year. This compares with a loss of €19,058 in the year to 31st December 2013. The reason for the profit in 2014 is due to the release of income in relation to the Cosmogrid project of €509,056. This income figure is offset by an overspend on the non-pay to meet the costs of the upgrade to the fire safety systems and investment in the Fionn cluster.

Total income for the Institute increased from €9,049,979 in 2013 after adjusting for pensions to €9,156,446 in 2014.

This represents an increase of €106,464 or 1.176% and the main increase occurred in projects due to the release of income on the Cosmogrid project. This income figure is offset in part by a decrease in the Grant-In-Aid.



*Back row l-r : Dr Otto Glaser, Prof. Denjoe O'Connor, Dr Thomas Kaltenbrunner, Deputy Head of Mission, Mr. Ralf Hospodarsky from Austrian Embassy.*

*Middle row l-r : Prof. Pádraig Breatnach, Prof. Werner Nahm, Prof. Tony Dorlas, Prof. Fergus Kelly, Prof. Liam Breatnach, Prof. Luke Drury.*

*Front row l-r : Prof. Dervilla Donnelly (former Chairman of Council, DIAS), His Excellency Ambassador Dr. Thomas Nader, Cecil Keaveney (Registrar of DIAS).*

*Líne chúil c-d: An Dr. Otto Glaser, An tOll. Denjoe O'Connor, An Dr. Thomas Kaltenbrunner, Leascheann Misin, An tUas. Ralf Hospodarsky ó Ambasad na hOstaire.*

*Dara líne c-d: An tOll. Pádraig Breatnach, An tOll. Werner Nahm, An tOll. Tony Dorlas, An tOll. Fergus Kelly, An tOll. Liam Breatnach, An tOll. Luke Drury.*

*Líne thosaigh c-d: an tOll. Dervilla Donnelly, An tAmbasadóir an Dr. Thomas Nader, Cecil Keaveney.*

# Riarachán agus Airgeadas

Cuireadh téarmaí Chomhaontú Bhóthar Haddington i bhfeidhm don fhoireann uile. Tá an méadú ar uaireanta oibre á chur i bhfeidhm ar bhonn céimnithe. Mar thoradh ar shrianta earcaíochta chomh maith le tuilleadh ciorruithe sa Deontas Pá, tá deacrachtaí ann le poist thábhachtacha a líonadh. Tá brú breise freisin ar sheirbhísí riaracháin agus tacaíochta teicniúla. Chomhoibrigh an fhoireann go hiomlán le tabhairt isteach socruithe nua caighdeánacha saoire agus le bearta eile a fhéachann le tionchar na lagduithe foirne a mhaolú.

Le cabhair ó chomhairleoir seachtrach um Chaidreamh Poiblí, rinneadh bearta i rith na bliana chun obair DIAS a chur chun cinn níos fearr agus chun feabhas a chur ar rannpháirtíocht phoiblí. Mar thoradh air seo, bhí poiblíocht níos fearr ann agus clúdaíodh roinnt ócáidí i rith na bliana sna meáin náisiúnta.

Cuireadh tús le hathbhreithniú ar chórais sábháilteachta dóiteáin ag tús na bliana a d'aithin bearta phráinneacha atá de dhíth chun an córas sábháilteachta dóiteáin ag láthair Bhóthar Burlington a uasghrádú. Tá plean á fhorbairt faoi láthair chun aghaidh a thabhairt air seo.

## Airgeadas

Tuairiscíonn na ráitis airgeadais iniata go raibh brabach €200,589 ann don bhliain. Tá sé seo i gcomparáid le caillteanas €19,058 sa bhliain go dtí an 31 Nollaig 2013. Is í an chúis leis an mbrabach sa bhliain 2014 ná an scaoileadh ioncaim de €509,056 maidir leis an tionscadal Cosmogrid. Fritháirítear an tsuim ioncaim seo le róchaiteachas sa neamhphá chun na costais a shásamh don uasghrádú ar na córais sábháilteachta dóiteáin agus infheistíocht sa bhraisle Fionn.

Méadaíodh ar an ioncam iomlán don Institiúid ó €9,049,979 in 2013 i ndiaidh leasaithe do phinsin go dtí €9,156,446 in 2014.



# Institute Staff

## Council of the Institute

### Chairman

V. Cunnane

### Ex-Officio Members

A. Deeks, President, UCD

L. Drury, President, RIA [to 15 March]

M. Daly, President, RIA [from 15 March]

P. Prendergast, Provost, TCD

### Members Appointed by the Governing Boards of Constituent Schools

G. Wrixon

A. Jaffe

A. Ahlqvist

L. Drury [from 16 March]

W. Nahm

L. Breatnach

## Governing Board of the School of Celtic Studies

### Chairman

A. Ahlqvist

### Senior Professors

L. Breatnach

F. Kelly [to 31 August]

P. Breatnach [to 31 December]

### Appointed Members

M. Herbert

R. Ó hUigín

E. Ní Dhea

K. Simms

N. Ó Muraíle

A. Ó Corráin

M. Ní Mhaonaigh

J. McCloskey

U. Mac Gearailt

## Governing Board of the School of Theoretical Physics

### Chairman

A. Jaffe

### Senior Professors

T. Dorlas

D. O'Connor

W. Nahm

### Appointed Members

A. Breslin

H. Nicolai

M. Grünewald

M. Tuite

P. Knight

L. Hau

R. Dijkgraaf

S. Shatashvili

D. Gilbert

D. Zagier

J. Frohlich

## Governing Board of the School of Cosmic Physics

### Chairman

G. Wrixon

### Senior Professors

L. Drury

A. Jones

### Appointed Members

A. Khan

O. Glaser

L. Enright

R. Perrott

M. Fowler

S. Cloetingh

L. Pedersen

C. Ceccarelli

E. Meehan

A. Watson

## **Administrative Staff of the Institute 2014**

### **Registrar**

C. Keaveney

### **Finance Officer**

G. Forkin

### **Senior Administrative Officer**

M. Burke

### **Assistant Finance Officer**

R. Byrne

### **Clerks**

M. Loughman

H. Moynihan

E. Barrett

M. Brennan

### **Head of IT**

D. Grigoriev

### **Senior Systems Administrator**

J. Bucas

### **Systems Administrator**

P. Grange

### **Support Staff**

R. Jones [to 26 August]

B. Judge

P. McDonald

C. Doyle

T. Ó Gríofa [to 15 November]

K. Earley

P. Wynne

## **Staff and Scholars of the School of Celtic Studies 2014**

### **Senior Professors**

L. Breatnach [Director]

P. Breatnach [to 31 December]

F. Kelly [to 31 August]

### **Professor**

B. Lewis [from 1 November]

### **Assistant Professors**

A. Nic Dhonnchadha

M. Ó Riordan [Publications Officer]

### **Dialectologist**

B. Ó Curnáin

### **Assistant Librarian**

M. Irons

### **Library Assistant**

Ó. Ní Chanainn

### **School Administrator**

E. Nic Dhonncha

### **Technical Staff**

#### **ISOS**

A. O'Brien

### **IT Support**

A. McCarthy [part-time]

S. McCullagh [part-time]

### **Bibliographer**

A. Guilarte

### **Bergin Fellows**

G. Ó Riain [Ireland]

## Institute Staff (continued)

### Staff and Scholars of the School of Celtic Studies 2014 (continued)

#### Scholars

E. Lash [U.S.A.] [to 3 April]  
S. Nic Lochlainn [Ireland] [to 30 September]  
N. Volmering [Netherlands]  
M. Jakob [Germany]  
S. Ní Mhurchú [Ireland]  
D. Hayden [U.S.A]  
M. Hoyne [Ireland] [from 4 August]  
F. Qui [China] [from 1 October]

#### Project Staff

##### *Ogham in 3D Principal Investigator*

N. White [from 1 February]

#### Professor Emeritus

M. Ó Murchú  
F. Kelly [from 1 September]

### Staff and Scholars of the School of Theoretical Physics 2014

#### Senior Professors

W. Nahm [Director]  
T. Dorlas  
D. O'Connor

#### Librarian

M. Williams [to 15 July]

#### Post-Doctoral Scholars

M. Beau [France] [to 4 October]  
B. Savoie [France]  
M. Leitner [Germany]  
V. Filev [Bulgaria]

#### Schroedinger Fellows

S. Kovacs [Italy] [to 31 March]  
G. Kells [Ireland] [from 1 May]

### Staff and Scholars of the School of Cosmic Physics 2014

#### Senior Professors

L. Drury [Director]  
A. Jones

#### Professors

T. Ray  
F. Aharonian  
Z. Martinec

#### Assistant Professors

S. Lebedev  
B. O'Reilly

#### Schroedinger Fellows

A. Taylor-Castillo [U.K.]  
V. Rath [Germany] [from 1 April]

#### Director of Observational Seismology

T. Blake

#### Senior Technical Assistants

C. Horan  
M. Smyth

#### Technical Assistants

E. Flood  
A. Grace  
H. O'Donnell  
L. Collins  
C. Hogg

#### Clerical Staff

P. Daly [to 31 May]  
A. Sewielska

## **Staff and Scholars of the School of Cosmic Physics 2014 (continued)**

### **Scholars**

E. Mandolesi [Italy] SFI Project  
D. Kiyan [Turkey] IRCSET (to 15 August)  
A. Schaeffer [Canada] SFI Project  
R. Ainsworth [USA] SFI Project (to 30 September)  
P. Dawson [Ireland] Brown Dwarfs (to 31 October)  
T. Farrell [Ireland] Iretherm  
S. Blake [Ireland] Iretherm  
T. Fritschle [Germany] Iretherm  
C. Romoli [Italy]  
D. Rodgers-Lee [Ireland]  
R. Delhaye [France/New Zealand] Iretherm  
A. Licciardi [Italy] SFI Project  
T. Waters [Ireland] Iretherm (to 31 March)  
J. Campaña [Spain] IRECCSEM (to 31 March)  
L. Sachl [Czech Republic] SFI Project  
M. Ravenna [Italy] SFI Project  
E. Neenan [Ireland] CTBTO  
D. Einspigel [Czech Republic] (from 6 March)  
X. Ogaya [Spain] IRCSEM (from 1 May)

### **Project Staff**

C. Moloney [Ireland] IGGP  
R. Azzollini [Spain] MIRI  
V. Geers [Holland] MIRI (to 31 August)  
J. Vozar [Slovakia] SFI Project  
N. Piana Agostinetti [Italy] SFI Project  
F. Le Pape [France] WAXI  
J. Campaña [Spain] SFI Project (from 1 April)  
C. Coughlan [Ireland] SFI Project (from 1 September)  
M. Prada [Spain] PIPCO Project (from 1 October)  
R. Ainsworth [USA] SFI Project (from 1 October)  
A. Caratti Garatti [Italy] SFI Project (from 1 November)  
R. García López [Spain] SFI Project (from 1 November)

### **Professor Emeritus**

P. Readman  
D. O'Sullivan  
A. Thompson

### **Vacation Students**

Ashten Sawitsky [15 May to 15 August]  
Caitriona Keogh [1 June to 15 August]  
Stephen Coakley [1 June to 15 August]  
Keith Galvin [1 June to 15 August]  
Maite Zabaltza Jimeno [22 September to 17 October]





# Financial Statements for year ended 31 December 2014

## CONTENTS

Statement of Responsibilities of the Council	46
Statement on Internal Financial Control	47
Report of the Comptroller & Auditor General	48
Accounting Policies	49
Income and Expenditure Account	50
Balance Sheet	51
Cash Flow Statement	52
Notes to the Financial Statements	53

# Statement of Responsibilities of the Council

The Council of the Dublin Institute for Advanced Studies is required under section 28(2) of the Institute for Advanced Studies Act 1940 to prepare financial statements in such form as shall be approved by the Minister for Education & Skills with the concurrence of the Minister for Finance.

In preparing those financial statements the Council is required to:

- select suitable accounting policies and apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Institute will continue in operation; and
- disclose and explain any material departures from applicable accounting standards.

The Council is responsible for keeping proper books of account which disclose with reasonable accuracy at any time the financial position of the Institute and which enable it to ensure that the financial statements comply with Section 28(2) of the Act. The Council is responsible for safeguarding the assets of the Institute and for taking reasonable steps for the prevention and detection of fraud and other irregularities.



**Anders Ahlqvist**

Council Member



**Liam Breatnach**

Council Member

# Statement on Internal Financial Control

## Responsibility for Internal Financial Control

On behalf of the Council of the Institute I acknowledge our responsibility for ensuring that an effective system of internal financial control is maintained and operated.

The system can only provide reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected in a timely period.

## Key Control Procedures

The Council has taken steps to ensure an appropriate control environment by

- clearly defining management responsibilities;
- establishing formal procedures for reporting significant control failures and ensuring appropriate corrective action.

The Council has established processes to identify and evaluate business risks by

- identifying the nature, extent and financial implication of risks facing the Institute including the extent and categories which it regards as acceptable;
- assessing the likelihood of identified risks occurring;
- assessing the Institute's ability to manage and mitigate the risks that do occur;
- assessing the costs of operating particular controls relative to the benefit obtained.

The system of internal financial control is based on a framework of regular management information, administrative procedures including segregation of duties, and a system of delegation and accountability.

In particular it includes:

- comprehensive budgeting system with an annual budget which is reviewed and agreed by the Council of the Institute;
- regular reviews by the Council of periodic and annual financial reports which indicate financial performance against forecasts;

- setting targets to measure financial and other performance;
- adherence to public procurement guidelines;
- regular reviews by the Council of external research projects.

The Audit Committee continues to review internal control matters and issues raised by the Comptroller and Auditor General. In 2014, the Audit Committee met on three occasions.

In addition, the 2014 report on internal control systems as provided by the Internal Auditor has been made available to Members of Council.

The Council's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal auditor, the Registrar and other officers within the Institute who have responsibility for the development and maintenance of an appropriate financial control framework and comments made by the Audit Committee and the Comptroller and Auditor General in his management letter or other reports.

## Annual Review of Controls

I confirm that in the year ended 31st December 2014, Council conducted a review of the effectiveness of the internal financial controls of the Institute.

Signed on behalf of the Council of the Institute



**Vincent Cunnane**

*Chairman - Council of the Institute*

25th June 2015

# Comptroller and Auditor General

## Report for presentation to the Houses of the Oireachtas

I have audited the financial statements of the Dublin Institute for Advanced Studies for the year ended 31 December 2014 under the Institute for Advanced Studies Act 1940. The financial statements, which have been prepared under the accounting policies set out therein, comprise the Accounting Policies, the Income and Expenditure Account, the Statement of Total Recognised Gains and Losses, the Balance Sheet, the Cash Flow Statement and the related notes. The financial statements have been prepared in the form prescribed under Section 28 of the Act and in accordance with Generally Accepted Accounting Practice in Ireland.

### Responsibilities of the Council

The Council is responsible for the preparation of the financial statements, for ensuring that they give a true and fair view of the state of the Institute's affairs and of its income and expenditure, and for ensuring the regularity of transactions.

### Responsibilities of the Comptroller and Auditor General

My responsibility is to audit the financial statements and report on them in accordance with applicable law.

My audit is conducted by reference to the special considerations which attach to State Bodies in relation to their management and operation.

My audit is carried out in accordance with the International Standards on Auditing [UK and Ireland] and in compliance with the Auditing Practices Board's Ethical Standards for Auditors.

### Scope of Audit of the Financial Statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements, sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of:

- whether the accounting policies are appropriate to the Institute's circumstances, and have been consistently applied and adequately disclosed
- the reasonableness of significant accounting estimates made in the preparation of the financial statements, and
- the overall presentation of the financial statements.

I also seek to obtain evidence about the regularity of financial transactions in the course of audit.

In addition, I read the Institute's Annual Report to identify material inconsistencies with the audited financial statements. If I become aware of any apparent material misstatements or inconsistencies I consider the implications for my report.

### Opinion on the Financial Statements

In my opinion, the financial statements, which have been properly prepared in accordance with Generally Accepted Accounting Practice in Ireland, give a true and fair view of the state of the Institute's affairs at 31 December 2014 and of its income and expenditure for the year then ended.

In my opinion, proper books of account have been kept by the Institute. The financial statements are in agreement with the books of account.

### Matters on which I Report by Exception

I report by exception if:

- I have not received all the information and explanations I required for my audit, or
- my audit noted any material instance where money has not been applied for the purposes intended or where the transactions did not conform to the authorities governing them, or
- the information given in the Institute's Annual Report is not consistent with the related financial statements, or
- the Statement on Internal Financial Control does not reflect the Institute's compliance with the Code of Practice for the Governance of State Bodies, or
- I find there are other material matters relating to the manner in which public business has been conducted.

I have nothing to report in regard to those matters.



**Colette Drinan**

For and on behalf of the Comptroller and Auditor General  
29 June 2015

# Accounting Policies

## GENERAL

The Institute was established under the Institute for Advanced Studies Act, 1940.

Its functions include the provision of facilities for the furtherance of advanced studies and the conduct of research in specialised branches of knowledge. It comprises three Schools - Celtic Studies, Theoretical Physics and Cosmic Physics.

## ACCOUNTING POLICIES

### 1. Basis of Accounting

The financial statements have been prepared on an accruals basis under the historical cost convention and in accordance with generally accepted accounting practice. Financial Reporting Standards recommended by the recognised accounting bodies are adopted as they become applicable.

### 2. Oireachtas Grants

Income is shown on a cash received basis.

### 3. Fixed Assets

Fixed Assets comprise the furniture, equipment, computers and motor vehicles of the Institute and are shown at cost less accumulated depreciation. The rates of depreciation, calculated on a straight line basis, are as follows:

Furniture and Equipment	10%
Computers	25%
Motor Vehicles	25%

Premises occupied by the Institute are leased from the Office of Public Works.

### 4. Capital Reserve

The capital reserve represents the unamortised value of income used for the purchase of Fixed Assets.

### 5. Library

Expenditure on library books and materials is written off in the year in which it is incurred.

### 6. Publications

Expenditure on publications is written off in the year in which it is incurred.

## 7. Superannuation

The Dublin Institute for Advanced Studies operates a defined benefit pension scheme which is funded annually on a pay as you go basis from monies available to it, including monies provided by the Department of Education and Skills and from contributions deducted from staff salaries.

Pension costs reflect pension benefits earned by employees in the period and are shown net of staff pension contributions which are retained by the Dublin Institute for Advanced Studies. An amount corresponding to the pension charge is recognised as income to the extent that it is recoverable, and offset by grants received in the year to discharge pension payments.

Actuarial gains or losses arising on scheme liabilities are reflected in the Statement of Recognised Gains and Losses and a corresponding adjustment is recognised in the amount recoverable from the Department of Education and Skills.

Pension liabilities represent the present value of future pension payments earned by staff to date. Deferred pension funding represents the corresponding asset to be recovered in future periods from the Department of Education and Skills.

## 8. Projects

The Dublin Institute for Advanced Studies receives external funding from industry, government bodies and the European Commission. A chart of accounts is maintained for each project.

Income and expenditure on projects is reflected in the financial statements in the year to which they relate. A surplus or deficit on a project is reflected in the financial statements when realised.



# Income and Expenditure Account

	Notes	2014 €	2013 €
<b>Income</b>			
Oireachtas Grant		6,201,000	6,442,000
Net deferred funding for pensions	11.c	1,338,169	1,372,232
Sales of Publications		44,507	37,030
Projects	2	1,533,675	1,143,236
Other	3	39,095	55,481
		9,156,446	9,049,979
Transfer from Capital Reserve	5	379,445	388,087
		9,535,891	9,438,066
<b>Expenditure</b>	1		
School of Celtic Studies		1,263,670	1,285,545
School of Theoretical Physics		801,333	931,123
School of Cosmic Physics		2,591,913	2,684,752
Administration		4,678,386	4,555,704
		9,335,302	9,457,124
<b>Surplus/(Deficit) for the year</b>		<b>200,589</b>	<b>[19,058]</b>
Balance at 1 January		661,047	680,105
<b>Balance at 31 December</b>		<b>861,636</b>	<b>661,047</b>
<b>Statement of Total Recognised Gains and Losses</b>		<b>2014 €</b>	<b>2013 €</b>
Surplus/(Deficit) for the year		200,589	[19,058]
Experience gains/(losses) on pension scheme liabilities		309,000	[487,000]
Changes in assumptions underlying the present value of pension scheme liabilities		[8,651,000]	2,794,000
<b>Actuarial (Loss)/Gain on Pension Liabilities</b>	11.b	<b>[8,342,000]</b>	<b>2,307,000</b>
<b>Adjustment to Deferred Pension Funding</b>		<b>8,342,000</b>	<b>[2,307,000]</b>
<b>Total Recognised Gain/(Loss) for the Year</b>		<b>200,589</b>	<b>[19,058]</b>

The Statement of Accounting Policies and notes 1 to 16 form part of these financial statements.



**Anders Ahlqvist**  
Council Member

25th June 2015



**Liam Breatnach**  
Council Member

25th June 2015

# Balance Sheet

	Notes	2014 €	2013 €
<b>Assets</b>			
Fixed Assets	4	1,352,903	1,732,348
Current Assets:			
Cash on Hand and at Bank		2,464,057	3,420,292
Debtors and Prepayments	7	173,199	178,282
Project Debtors	2[a]	36,883	44,306
<b>Total Assets</b>		<b>4,027,042</b>	<b>5,375,228</b>
<b>Less Liabilities</b>			
Creditors - Amounts falling due within one year			
Creditors and Accruals	6	668,231	1,376,531
Project Creditors	2[a]	1,116,589	1,577,653
Creditors - Amounts falling due after one year	6	27,683	27,649
<b>Total Liabilities Before Pensions</b>		<b>1,812,503</b>	<b>2,981,833</b>
<b>Assets Less Liabilities Before Pensions</b>		<b>2,214,539</b>	<b>2,393,395</b>
Deferred Pension funding	11.c	53,870,000	44,190,000
Pension Liabilities	11.b	[53,870,000]	[44,190,000]
		0	0
<b>Net Assets</b>		<b>2,214,539</b>	<b>2,393,395</b>
<b>Financed by:</b>			
Income and Expenditure Account		861,636	661,047
Capital Reserve	5	1,352,903	1,732,348
		<b>2,214,539</b>	<b>2,393,395</b>

The Statement of Accounting Policies and notes 1 to 16 form part of these financial statements.



**Anders Ahlqvist**  
Council Member

25th June 2015



**Liam Breatnach**  
Council Member

25th June 2015

# Cash Flow Statement

	Notes	2014 €	2013 €
<b>Reconciliation of Operating Surplus/(Deficit) to Net Cash [Outflow]/Inflow from Operating Activities</b>			
Surplus/(Deficit) for the Year		200,589	[19,058]
Interest Received	3	[19,979]	[36,229]
Decrease in Creditors		[708,265]	[189,766]
Decrease in Debtors		5,082	34,915
Net [Decrease]/Increase in Research Programmes and Fees		[453,641]	103,605
Depreciation	4	440,087	515,330
Capital Reserve Transfer	5	[379,445]	[388,087]
Loss on Disposal		117	-
<b>Net Cash [Outflow]/Inflow from Operating Activities</b>		<b>[915,455]</b>	<b>20,710</b>
<b>Cash Flow Statement</b>			
Net Cash [Outflow]/Inflow from Operating Activities		[915,455]	20,710
<b>Returns on Investments and Servicing of Finance</b>			
Bank Interest Received	3	19,979	36,229
<b>Capital Expenditure</b>			
Purchase of Tangible Assets	4	[60,759]	[127,243]
<b>Decrease in Cash</b>		<b>[956,235]</b>	<b>[70,304]</b>
<b>Reconciliation of Net Cash Flow to Movement in Net Funds</b>			
Decrease in Cash		[956,235]	[70,304]
Net Funds at 1 January		3,420,292	3,490,596
<b>Net Funds at 31 December</b>		<b>2,464,057</b>	<b>3,420,292</b>

<b>Analysis of Change in Net Funds</b>	<b>Cash at bank and in hand €</b>
At Beginning of Year 2014	3,420,292
Cash Flows	[956,235]
<b>At End of Year 2014</b>	<b>2,464,057</b>

The Statement of Accounting Policies and notes 1 to 16 form part of these financial statements.



**Anders Ahlqvist**  
Council Member

25th June 2015



**Liam Breatnach**  
Council Member

25th June 2015

# Notes to the Financial Statements

## 1. Detailed Analysis of Income & Expenditure for the year ended 31/12/2014

	Notes	School of Celtic Studies €	School of Theoretical Physics €	School of Cosmic Physics €	Adminis- tration €	2014 Total €	2013 Total €
<b>INCOME</b>							
Dept. of Education and Skills Grant-In-Aid (Annual)		1,462,672	899,855	2,278,587	1,559,886	6,201,000	6,442,000
*Net Deferred Funding for Pensions	11.c	[334,928]	[105,186]	[654,840]	2,433,123	1,338,169	1,372,232
Sales of Publications		44,507	-	-	-	44,507	37,030
Project Income	2.a	80,832	6,422	1,446,421	-	1,533,675	1,143,236
Other	3	-	-	423	38,672	39,095	55,481
		1,253,083	801,091	3,070,591	4,031,681	9,156,446	9,049,979
<b>Transfer from Capital Reserve</b>					379,445	379,445	388,087
		1,253,083	801,091	3,070,591	4,411,126	9,535,891	9,438,066
<b>EXPENDITURE</b>							
Payroll Costs	8	1,091,008	722,606	1,496,222	703,971	4,013,807	4,239,173
*Pension Costs	11.a	[25,654]	[31,333]	[45,527]	2,596,943	2,494,429	2,470,820
*Pension Project Costs	11.a	-	-	[2,299]	-	[2,299]	-
Project Costs	2.a	78,758	6,422	904,232	-	989,412	1,135,297
Library and Book Storage		46,196	65,769	49,841	-	161,806	163,217
Depreciation	4	-	-	-	440,087	440,087	515,330
Rent, Rates and Insurance		-	-	-	200,212	200,212	192,305
General Expenses	9	22,989	525	33,416	253,029	309,959	152,386
Travel and Seminar Expenses		20,544	22,888	59,712	8,336	111,480	83,066
Premises Maintenance and Security		-	-	-	238,311	238,311	163,408
Computer and Internet Expenses		1,327	13,305	85,606	53,214	153,452	111,938
Fuel Light and Power		-	-	-	150,537	150,537	147,793
Postage and Telephone		-	-	-	24,338	24,338	27,067
Stationery		9,862	149	6,258	5,781	22,050	20,563
Publications		16,005	-	3,077	-	19,082	15,962
Advertising		2,604	332	902	1,375	5,213	2,745
Minor Office Equipment		31	670	473	2,135	3,309	16,054
Disposal	5	-	-	-	117	117	-
		1,263,670	801,333	2,591,913	4,678,386	9,335,302	9,457,124
<b>SURPLUS/(DEFICIT) FOR YEAR</b>		<b>(10,587)</b>	<b>(242)</b>	<b>478,678</b>	<b>(267,260)</b>	<b>200,589</b>	<b>(19,058)</b>
Balance at 1 January		272,307	97,788	1,109,797	[818,846]	661,047	680,105
<b>Balance at 31 December</b>		<b>261,720</b>	<b>97,546</b>	<b>1,588,475</b>	<b>[1,086,106]</b>	<b>861,636</b>	<b>661,047</b>

**Note (a):** \* The net of 11c and 11a represents the superannuation paid less contributions deducted within each of the schools and section.

**Note (b):** Costs directly related to research (e.g., pay, library, computer expenses, travel) have been apportioned to the schools. Overhead costs such as rent, insurance, utilities and property maintenance have been charged to Administration.

## Notes to the Financial Statements [continued]

### 2. (a) Projects

	2014 €	2013 €			
Opening Balances	1,533,347	1,429,742			
Receipts	1,080,034	1,246,841			
	2,613,381	2,676,583			
Closing Balances [Project Debtors €36,883, Project Creditors €1,116,589]	(1,079,706)	(1,533,347)			
Applied as Income	1,533,675	1,143,236			
<b>Income Allocation</b>					
School of Celtic Studies	80,832	70,282			
School of Theoretical Physics	6,422	101,694			
School of Cosmic Physics	1,446,421	971,260			
	1,533,675	1,143,236			
Total Project Income	1,533,675	1,143,236			
<b>Project Costs</b>					
	<b>Celtic Studies €</b>	<b>Theoretical Physics €</b>	<b>Cosmic Physics €</b>	<b>2014 Total €</b>	<b>2013 Total €</b>
Payments to Partners/Associates	11,630	-	107,602	119,232	75,035
Salaries/Scholarships	40,840	-	561,083	601,923	631,495
Travel	784	1,561	163,349	165,694	290,221
Other	25,504	4,861	72,198	102,563	138,546
Total Project Cost	78,758	6,422	904,232	989,412	1,135,297

### 2.(b) Project Detail

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income [including Capital] €	Closing Balance €	Capital €
<b>School of Celtic Studies</b>							
Irish Script on Screen		16,858	-	147	2,221	14,637	[2,074]
Celtic Summer School		12,960	20,435	24,602	24,602	8,793	-
Ogham	Dept. Arts	28,923	30,000	54,009	54,009	4,914	-
<b>Total Celtic Studies</b>		<b>58,741</b>	<b>50,435</b>	<b>78,758</b>	<b>80,832</b>	<b>28,344</b>	<b>[2,074]</b>



## Notes to the Financial Statements [continued]

### 2.(b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
<b>School of Theoretical Physics</b>							
Bethe Ansatz	SFI	11,233	-	-	-	11,233	-
T. Tchraikian	SFI	12,671	-	1,637	1,637	11,034	-
Veselin Filev Inspire Award	IRCSET	5,858	-	-	-	5,858	-
M. Ihl Fellow	IRCSET	10,124	-	-	-	10,124	-
G. Kells	SFI	-	4,335	4,785	4,785	[450]	-
<b>Total Theoretical Physics</b>		<b>39,886</b>	<b>4,335</b>	<b>6,422</b>	<b>6,422</b>	<b>37,799</b>	<b>-</b>
<b>School of Cosmic Physics</b>							
Gamma Ray Bursts	SFI	13,543	-	-	-	13,543	-
<b>Total Astronomy</b>		<b>13,543</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>13,543</b>	<b>-</b>
Dos Max	EC	1,502	-	-	1,502	-	-
CosmoGrid	PRTL	509,056	-	-	509,056	-	-
Nam Conference	A. Observatory	29,769	-	-	-	29,769	-
Jetset	EC	6,637	-	4,737	4,737	1,900	-
GNM	SFI	13,740	-	4,118	4,118	9,622	-
E-Inis-Cycle 4	PRTL	263,891	[143,964]	[3,928]	[3,928]	123,855	-
Pic Simulations	SFI	60,789	-	3,041	3,041	57,748	-
D. Coffey Fellow	IRCSET	6,350	-	-	-	6,350	-
KM3Net-PP	EC	10,813	-	6,447	6,447	4,366	-
E. Whelan Inspire	IRCSET	8,452	-	1,703	1,703	6,749	-
NGST Project	ESA	[35,073]	149,635	110,558	113,734	828	[3,176]
Dobies	ESA	2,912	-	2,325	2,912	-	-
KVM3Net	EC	7,136	-	195	195	6,941	-
Valenti EC Reintegration	EC	12,486	-	4,500	4,500	7,986	-
Aleks Scholz-Brown Dwarfs	SFI	27,201	-	15,160	15,160	12,041	-
Origin of Jets	SFI	22,171	20,178	24,856	24,856	17,493	-
EASY T. Ray 2014	SFI	-	269,214	57,389	69,235	199,979	[11,846]
<b>Total Astrophysics</b>		<b>947,832</b>	<b>295,063</b>	<b>231,101</b>	<b>757,268</b>	<b>485,627</b>	<b>[15,022]</b>

## Notes to the Financial Statements (continued)

### 2.(b) Project Detail (continued)

	Funding Authority	Opening Balance	Receipts	Recurrent Expenditure	Applied as Income (including Capital)	Closing Balance	Capital
		€	€	€	€	€	€
Samtex	Industry	16,546	-	2,780	2,780	13,766	-
Geo External Funds	Industry	5,544	8,050	7,759	7,759	5,835	-
Joint RFP	SFI	5,213	-	5,213	5,213	-	-
Isle 2	SFI	5,918	-	501	501	5,417	-
Geophysics Schools Seismology	Various	6,905	2,050	-	-	8,955	-
Dynamics of Continuity	SFI	7,347	-	4,790	4,790	2,557	-
TopoMed	IRCSET	22,495	-	14,487	14,487	8,008	-
Regional Seismic	SFI	[9,233]	15,160	1,972	1,972	3,955	-
CTBTO	Dept. For. Affairs	-	3,989	-	1,058	2,931	[1,058]
Irish Geoscience Graduate Prog.	Dept. Commun.	37,233	6,125	40,280	40,280	3,078	-
IRETHERM	SFI	197,275	181,703	200,477	198,178	180,800	-
GIANICE 11	SFI	61,530	19,545	23,675	23,675	57,400	-
SIRG E2174	SFI	44,194	140,397	145,543	147,087	37,504	[1,544]
ESA UWB Grant	ESA	34,835	-	2,171	2,171	32,664	-
WAXI	Industry	12,309	58,668	46,059	46,059	24,918	-
IRECCSEM	SFI	25,234	52,275	106,005	113,942	[36,433]	[7,937]
Crust	SFI	-	142,239	4,128	6,976	135,263	[2,848]
PIPCO		-	100,000	67,291	72,225	27,775	[4,934]
<b>Total Geophysics</b>		<b>473,345</b>	<b>730,201</b>	<b>673,131</b>	<b>689,153</b>	<b>514,393</b>	<b>[18,321]</b>
<b>Total Cosmic Physics</b>		<b>1,434,720</b>	<b>1,025,264</b>	<b>904,232</b>	<b>1,446,421</b>	<b>1,013,563</b>	<b>[33,343]</b>
<b>Total Net Balances - DIAS</b>		<b>1,533,347</b>	<b>1,080,034</b>	<b>989,412</b>	<b>1,533,675</b>	<b>1,079,706</b>	<b>[35,417]</b>

#### Note

Project receipts are applied as project income, at a level that equals the annual expenditure incurred by the associated project. The closing balances above represent overhead earned to date and advance funding to meet financial commitments in 2015. The capital column outlines the expenditure on fixed assets during 2014.

### 3. Other Income

	2014	2013
	€	€
Bank Interest	19,979	36,229
Fees and Grants	11,399	1,597
Other	7,717	17,655
<b>Total</b>	<b>39,095</b>	<b>55,481</b>

## Notes to the Financial Statements [continued]

### 4. Fixed Assets

	<b>Furniture &amp; Equipment</b>	<b>Motor Vehicles</b>	<b>Computers</b>	<b>Total</b>
<b>Cost</b>	<b>€</b>	<b>€</b>	<b>€</b>	<b>€</b>
Opening Balance 1/1/2014	3,895,554	45,700	2,233,444	6,174,698
Additions*	6,950	-	53,809	60,759
Disposals**	[141,255]	-	[12,346]	[153,601]
	<b>3,761,249</b>	<b>45,700</b>	<b>2,274,907</b>	<b>6,081,856</b>
<b>Depreciation</b>				
Opening Balance 1/1/2014	2,643,680	44,245	1,754,425	4,442,350
Charge	228,329	438	211,320	440,087
Disposals	[141,138]	-	[12,346]	[153,484]
	<b>2,730,871</b>	<b>44,683</b>	<b>1,953,399</b>	<b>4,728,953</b>
Net book value 31/12/2014	1,030,378	1,017	321,508	1,352,903
Net book value 31/12/2013	1,251,874	1,455	479,019	1,732,348

#### Note

\* All fixed assets in excess of €1,000 are capitalised in the books of DIAS.

\*\* Following a detailed furniture and equipment asset verification exercise, the register was updated to reflect a large number of disposals that had occurred in previous years.

### 5. Capital Reserve

	<b>2014</b>	<b>2013</b>
	<b>€</b>	<b>€</b>
Balance at 1 January	1,732,348	2,120,435
<b>Transfer to Income and Expenditure Account</b>		
Income allocated to acquire fixed assets [Project Funded]	35,417	11,258
Income allocated to acquire fixed assets [Exchequer Funded]	25,342	115,985
Amortisation in line with asset depreciation	[440,087]	[515,330]
Amount released on disposals	[117]	-
	<b>[379,445]</b>	<b>[388,087]</b>
<b>Balance at 31 December</b>	<b>1,352,903</b>	<b>1,732,348</b>

## Notes to the Financial Statements [continued]

### 6. Creditors due within twelve months

	2014	2013
	€	€
Trade Creditors	123,860	82,872
Accruals	157,193	973,237
Sundry	-	12,004
VAT	39,233	17,955
Revenue Creditors	131,623	129,534
Pension Control Account	216,322	160,929
	668,231	1,376,531

### Creditors due after twelve months

	2014	2013
	€	€
These comprise:		
Vernam Hull Bequest	25,223	25,189
Carmody Fund	2,460	2,460
	27,683	27,649

The funds relating to the above are held on deposit.

### 7. Debtors

	2014	2013
	€	€
Prepayments	150,033	159,970
Book Sales Debtors	1,511	2,777
Sundry	21,655	15,535
	173,199	178,282

### 8. Payroll Costs

	Celtic Studies	Theoretical Physics	Cosmic Physics	Admin.	2014 Total	2013 Total
	€	€	€	€	€	€
Salaries/Wages	951,170	618,852	1,339,315	703,971	3,613,308	3,893,862
Scholarships	136,040	94,019	145,890	-	375,949	327,669
Visitors	3,198	9,735	11,017	-	23,950	15,770
Honoraria	600	-	-	-	600	1,872
	1,091,008	722,606	1,496,222	703,971	4,013,807	4,239,173

#### Note

Pension levy deductions of €253,145 [2013: €278,267] were paid to the Department of Education and Skills during 2014. Staff Numbers 52.5 [2013:55.5], ECF Numbers 55 [2013: 56].

## Notes to the Financial Statements [continued]

### 9. General Expenses

	<b>Celtic Studies €</b>	<b>Theoretical Physics €</b>	<b>Cosmic Physics €</b>	<b>Admin. €</b>	<b>2014 Total €</b>	<b>2013 Total €</b>
Miscellaneous	18,640	381	29,051	88,456	136,528	45,464
Promotions/ Lunches	3,854	144	3,997	4,142	12,137	15,224
Professional Fees	-	-	-	113,102	113,102	36,099
Training	495	-	300	1,031	1,826	5,684
Audit Fee	-	-	-	18,800	18,800	18,800
Bank Charges	-	-	-	2,368	2,368	2,568
Board Meeting Expenses	-	-	-	20,124	20,124	22,170
Health & Safety	-	-	68	5,006	5,074	6,377
	<b>22,989</b>	<b>525</b>	<b>33,416</b>	<b>253,029</b>	<b>309,959</b>	<b>152,386</b>

### 10. Leasing

#### Operating Leases

The premises occupied by the Institute are leased from the Office of Public Works.

The premises include Observatory House Dunsink, 5 Merrion Square, 9-10 Burlington Road and 31 Fitzwilliam Place.

There is a term of 84 years left on the lease for Observatory House and the other leases are renewed on an annual basis.

The commitment on foot of such leases in respect of 2015 is €113,609.

<b>Office of Public Works Leases</b>	<b>Annual Rent €</b>
Observatory House Dunsink	330
5 Merrion Square	5,022
9-10 Burlington Road	50,167
31 Fitzwilliam Place	58,090
	<b>113,609</b>

## Notes to the Financial Statements [continued]

### 11. Pension Costs

#### a) Analysis of total pension costs charged to Expenditure

	2014 (€'000)	2013 (€'000)
Current Service Cost	953	1,019
Interest on Pension Scheme Liabilities	1,669	1,593
Employee Contributions	[130]	[141]
	<b>2,492</b>	<b>2,471</b>

#### b) Movement in Net Pension Liability during the financial year

	2014 (€'000)	2013 (€'000)
Net Pension Liability at 1 January	[44,190]	[45,125]
Current Service Cost	[953]	[1,019]
Interest Costs	[1,669]	[1,593]
Actuarial [Loss]/Gain	[8,342]	2,307
Pensions Paid in the Year	1,284	1,240
<b>Net Pension Liability at 31 December</b>	<b>(53,870)</b>	<b>[44,190]</b>

#### c) Deferred Funding for Pensions

DIAS recognises these amounts as an asset corresponding to the unfunded deferred liability for pensions on the basis of the set of assumptions described above and a number of past events. These events include the statutory basis for the establishment of the pension scheme, and the policy and practice in relation to funding public service pensions including contributions by employees and the annual estimates process.

While there is no formal agreement regarding these specific amounts with the Department of Education and Skills, the DIAS has no evidence that this funding policy will not continue to meet such sums amount in accordance with current practice. The Net Deferred Funding for Pensions recognised in Income and Expenditure Account was as follows:

	2014 (€'000)	2013 (€'000)
Funding Recoverable in Respect of Current Year Pension Costs	2,622	2,612
State Grant Applied to Pay Pensioners	[1,284]	[1,240]
	<b>1,338</b>	<b>1,372</b>

The deferred funding asset for pensions as at 31 December 2014 amounted to €53.870 million [2013: €44.190 million].

#### d) History of defined benefit obligations

	2014 (€'000)	2013 (€'000)	2012 (€'000)
Defined Benefit Obligations	53,870	44,190	45,125
Experience [Gains]/Losses on Scheme Liabilities Amount.	309	[487]	2,499
Percentage of Scheme Liabilities.	0.60%	[1.10%]	5.50%

The cumulative actuarial [gain]/loss recognised in the Statement of Total Recognised Gains and Losses amounts to €4,941,000.



## Notes to the Financial Statements (continued)

### 11. Pension Costs (continued)

#### e) General Description of the Scheme

The pension scheme is a defined benefit final salary pension arrangement with benefits and contributions defined by reference to current "model" public sector scheme regulations. The scheme provides a pension (eightieths per year of service), a gratuity or lump sum (three eightieths per year of service) and spouse's and children's pensions. Normal Retirement Age is a member's 65th birthday, and pre 2004 members have an entitlement to retire without actuarial reduction from age 60. Pensions in payment (and deferment) normally increase in line with general public sector salary inflation. The valuation used for FRS17 disclosures has been based on a full actuarial valuation by a qualified independent actuary taking account of the requirements of the FRS in order to assess the scheme liabilities at 31 December 2014.

The principal actuarial assumptions were as follows:

	2014	2013	2012
Rate of Increase in Salaries	2.50%	3.00%	3.00%
Rate of Increase in Pensions in Payment	2.00%	2.50%	2.50%
Discount Rate	2.25%	3.75%	3.50%
Inflation Rate	1.50%	2.00%	2.00%

The mortality basis adopted allows for improvements in life expectancy over time, so that the life expectancy at retirement will depend on the year in which a member attains retirement age (age 65). The table below shows the life expectancy for members attaining age 65 in 2014 and 2034.

	2014	2034
Year of Attaining Age 65		
Life Expectancy - Male	87.3	89.9
Life Expectancy - Female	88.7	90.9

### 12. Disclosure of Transactions

The Council of the Institute adopts procedures in accordance with guidelines issued by the Department of Finance in relation to the disclosure of interests by Council Members and these procedures have been adhered to by the Council Members during the year. No Council Member has declared an interest.

## Notes to the Financial Statements [continued]

### 13. Disclosure of Council Members/Registrar Salary, Fees and Expenses

	Total Remuneration 2014 €	Total Expenses 2014 €	Total Remuneration 2013 €	Total Expenses 2013 €
<b>Council Member</b>				
Dr Vincent Cunnane	-	1,551	-	261
<b>Members Appointed by the Governing Boards of Constituent Schools</b>				
Professor Gerry Wrixon	-	336	-	126
Professor Arthur Jaffe	-	2,065	-	1,325
Professor Anders Ahlqvist	-	3,860	-	7,262
Professor Werner Nahm	-	-	-	-
Professor Luke Drury	-	-	-	-
Professor Padraig Breatnach	-	-	-	-
<b>Registrar</b>				
Mr. Cecil Keaveney *	97,906	-	100,756	-
	97,906	7,812	100,756	8,974

#### \* Note

The Registrar is in receipt of a salary only. He is not paid any bonus. The Registrar's pension entitlements does not exceed the standard entitlements in the model public sector defined benefit superannuation scheme.

### 14. Number of Employees with Benefits in 2014 that fall within bands of €10,000 from €60,000 onwards

No. of Employees with benefits €60k	No. of Employees with benefits €70k	No. of Employees with benefits €90k	No. of Employees with benefits €100k	No. of Employees with benefits €110k	No. of Employees with benefits €120k	No. of Employees with benefits €130k
1	6	4	1	1	3	4

### 15. Employer Pension Contributions

Employer contributions in 2014 totalled €49,094.

### 16. Approval of Accounts

The Financial Statements were approved by Council on the 25th June 2015.

# Ráitis Airgeadais don bhliain dár críoch 31 Nollaig 2014

## CLÁR

Ráiteas Freagrachtaí na Comhairle	64
Ráiteas faoin gCóras Rialaithe Airgeadais Inmheánaigh	65
Tuairisc an Ard-Reachtair Cuntas agus Ciste	66
Polasaithe Chuntasaíochta	67
Cuntas Ioncaim agus Caiteachais	68
Clár Comhardaithe	69
Ráiteas Sreabhadh Airgid	70
Nótaí do na Ráitis Airgeadais	71

# Ráiteas Freagrachtaí na Comhairle

Éilítear ar Chomhairle Institiúid Ard-Léinn Bhaile Átha Cliath faoi alt 28[2] den Acht um Institiúid Ard-Leighinn, 1940 ráitis airgeadais a ullmhú ar shlí a cheadóidh an tAire Oideachais & Eolaíochta le comhthoiliú an Aire Airgeadais.

Agus an Chomhairle ag ullmhú na ráitis airgeadais sin éilítear uirthi:

- polasaithe chuntasaíochta oiriúnacha a roghnú agus iad a chur i bhfeidhm go comhleanúnach;
- breithiúnais agus meastacháin a dhéanamh atá réasúnach agus stuama;
- na ráitis airgeadais a ullmhú ar bhonn gnóthais leantach mura bhfuil sé míchuí glacadh leis go leanfaidh an Institiúid ag oibriú; agus
- aon imeacht ábhartha ó chaighdeán chuntasaíochta infheidhme a nochtadh agus a mhíniú

Tá freagracht ar an gComhairle leabhair chuntais chearta a choinneáil a nochtaíonn ag aon am le cruinneas réasúnach staid airgeadais na hInstitiúide agus a chuireann ar a cumas a chinntiú go gcloíonn na ráitis airgeadais le hAlt 28[2] den Acht. Tá freagracht ar an gComhairle sócmhainní na hInstitiúide a shlánú agus as céimeanna réasúnacha a ghlacadh le cosc a chur ar chalaois agus ar neamhrialtachtaí eile agus iad a aimsiú.



**Anders Ahlqvist**

*Comhalta Den Chomhairle*



**Liam Breatnach**

*Comhalta Den Chomhairle*

# Ráiteas faoin gCóras Rialaithe Airgeadais Inmheánaigh

## Freagracht as an gCóras Rialaithe Airgeadais Inmheánaigh

Thar ceann Chomhairle na hInstitiúide is mian liom ár bhfreagracht a chur in iúl lena chinntiú go ndéantar cothabháil agus go n-oibrítear córas rialaithe airgeadais inmheánaigh.

Ní féidir leis an gcóras ach dearbhú réasúnach agus ní dearbhú críochnaitheach a chur ar fáil go ndéantar slánú ar shócmhainní, go mbíonn idirbheartaíochtaí údaráithe agus taifeadta i gceart, agus go gcuirtear cosc ar earráidí ábhartha nó ar neamhrialtachtaí nó go n-aimseofaí iad i dtreimhse chaoithiúil.

## Nósanna Imeachta Rialaithe Lárnacha

Tá céimeanna glactha ag an gComhairle lena chinntiú go mbeidh timpeallacht rialaithe chuí i bhfeidhm trí

- sainmhíniú soiléir a thabhairt maidir le freagrachtaí bainistíochta;
- nósanna imeachta foirmiúla a bhunú le teipeanna rialaithe suntasacha a thuairisciú agus lena chinntiú go dtógtar gníomh cuí leis an gceist a cheartú.

Tá próisis bunaithe ag an gComhairle le rioscaí gnó a aithint agus iad a luacháil trí

- nádúr, méid agus tionchar airgeadais na rioscaí a bhíonn os comhair na hInstitiúide a aithint lena n-áirítear méid agus catagóir a mheasann an Institiúid a bheith inghlactha;
- measúnú a dhéanamh ar an dóchúlacht atá ann go dtarlóidh na rioscaí aitheanta;
- measúnú a dhéanamh ar chumas na hInstitiúide na rioscaí a tharlaíonn a bhainistiú agus a mhaolú;
- measúnú a dhéanamh ar na costais a bhaineann le rialacháin áirithe a oibriú a bhaineann leis an sochar a bhaintear amach.

Tá an córas rialaithe airgeadais inmheánaigh bunaithe ar chreat oibre eolais bainistíochta rialta, nósanna imeachta riaracháin lena n-áirítear dualgais a roinnt, agus córas toscaireachta agus cuntasachta.

Áirítear leis go háirithe:

- córas buiséid cuimsitheach le buiséad bliantúil a ndéanann Comhairle na hInstitiúide athbhreithniú air agus a bhíonn comhaontaithe aici;
- athbhreithnithe rialta ag an gComhairle ar thuairiscí airgeadais tréimhseacha agus bliantúla a léiríonn feidhmíocht airgeadais in aghaidh réamhaisnéis;
- spriocanna a leagan síos le feidhmíocht airgeadais agus feidhmíocht eile a thomhas;
- cloí le treoirlínte chun soláthar don earnáil phoiblí.
- athbhreithnithe rialta ag an gComhairle ar thionscadail taighde seachtaracha.

Leanann an Coiste Iniúchóireachta ag déanamh athbhreithniú ar chúrsaí rialaithe inmheánacha agus ar shaincheisteanna a d'ardaigh an tArd-Reachtaire Cuntas agus Ciste. I 2014, bhail an Coiste Iniúchóireachta le cheile trí huair. Ina theannta sin, an tuarascáil ar chórais rialaithe inmheánacha don bhliain 2014 a chuir an tIniúcháir Inmheánach ar fáil tugadh do bhaill na Comhairle í.

Tá monatóireacht agus athbhreithniú na Comhairle ar éifeachtúlacht an chórais rialaithe airgeadais inmheánaigh coinnithe ar an eolas trí obair an iniúchóra inmheánaigh, trí obair an Chláraitheora agus oifigigh eile laistigh den Institiúid atá freagrach as creat oibre rialaithe airgeadais cuí a fhorbairt agus a chothabháil, agus trí thuairimí a dhéanann an Coiste Iniúchta agus an tArd-Reachtaire Cuntas agus Ciste ina litir bhainistíochta no i dtuairiscí eile.

## Athbhreithniú Bliantúil ar Rialacháin

Dearbhaím go ndearna an Bord athbhreithniú ar éifeachtachas chórais rialaithe airgeadais inmheánaigh na hInstitiúide sa bhliain dár críoch 31ú Nollaig 2014.

Sínithe thar ceann Chomhairle na hInstitiúide



**Vincent Cunnane**

Cathaoirleach-Comhairle Na hInstitiúide

25 Meitheamh 2015

# Tuarascáil an Ard-Reachtair Cuntas agus Ciste

le cur i láthair Thithe an Oireachtais

## Institiúid Ard-Léinn Bhaile Átha Cliath

Tá ráitis airgeadais Institiúid Ard-Léinn Bhaile Átha Cliath don bhliain dar críoch 31 Nollaig 2013 iniúchta agam faoin Acht Um Institiúid Ard-Léinn, 1940.

Tá na ráitis airgeadais, a ullmhaíodh faoi na beartais chuntasaíochta arna leagan amach sna ráitis, comhdhéanta de na Beartais Chuntasaíochta, an Cuntas Ioncaim agus Caiteachais, an Ráiteas Gnóthachan agus Caillteanas Aitheanta Iomlán, an Clár Comhardaithe, an Ráiteas ar Shreabhadh Airgid, agus na nótaí gaolmhara. Ullmhaíodh na ráitis airgeadais san fhoirm a leagtar amach faoi Alt 28 den Acht agus de réir Cleachtas Chuntasaíochta a nGlactar Leis go Coitianta in Éirinn.

## Freagrachtaí na Comhairle

Tá an Chomhairle freagrach as na ráitis airgeadais a ullmhú, as léargas fóircheart ar riocht ghnóthaí na hInstitiúide a chinntiú, as a hioncam agus a caiteachas a chinntiú, agus as rialtacht na n-idirbheart a chinntiú.

## Freagrachtaí an Ard-Reachtair Cuntas agus Ciste

Is é m'fhreagrachta ná na ráitis airgeadais a iniúchadh agus tuairisc a thabhairt orthu de réir dlí is infheidhme.

Riar mé m'iniúchadh trí thagairt a dhéanamh to na nithe ar leith is gá a chur san áireamh i ndáil le cúrsaí bainisteoireachta agus oibriúcháin a ghabhann le Comhlachtaí Stáit.

Rinne mé m'iniúchadh de réir Caighdeán Idirnáisiúnta maidir le hIniúcháireacht (Ríocht Aontaithe agus Éire) agus de réir Caighdeán Eiticíúil an Bhoird um Chleachtais Iniúcháireachta d'Iniúcháirí.

## Réimse Iniúchta na Ráiteas Airgeadais

Cuimsíonn iniúchadh fianaise a fháil faoi na suimeanna agus na nochtuithe sna ráitis airgeadais, ionas go mbeadh leordhóthain fianaise agam a d'fhágfadh cinnteacht réasúnach ann go bhfuil na ráitis airgeadais saor ó mhíráiteas ábhartha, cibé acu calaóis nó neamhrialtacht is cúis leis sin. Cuimsíonn sé seo measúnú

- an n-oireann na beartais chuntasaíochta don bhail atá ar chúrsaí na hInstitiúide, ar feidhmíodh na beartais sin ar bhealach leanúnach agus ar foilsíodh iad ar bhealach sásúil
- réasúntacht meastacháin suntasacha chuntasaíochta a rinneadh in ullmhúchán na ráiteas airgeadais, agus
- leagan amach foriomlán na ráiteas airgeadais.

ina theannta sin, léigh mé Tuarascáil Bhliantúil na hInstitiúide le haghaidh neamhréireachtaí ábhartha leis na ráitis airgeadais iniúchta. Mar aon leis sin, léim an fhaisnéis airgeadais agus neamhairgeadais sa Tuarascáil Bhliantúil chun neamhréireachtaí ábhartha a aithint leis na ráitis airgeadais iniúchta. Má thagaim ar an eolas faoi mhíráitis ábhartha dealraitheacha nó neamhréireachtaí cuirim na himpleachtaí san áireamh i mo thuarascáil.

## Tuairim ar na Ráitis Airgeadais

Is é mo thuairim go dtugann na ráitis airgeadais, a ullmhaíodh i gceart de réir Cleachtais Chuntasaíochta a nGlactar Leis go Coitianta in Éirinn, léargas fóircheart ar riocht ghnóthaí na hInstitiúide ag 31 Nollaig 2014 agus ar a hioncam agus ar a caiteachas don bhliain 2014.

Is é mo thuairim go raibh leabhair chuntais chuí coinnithe ag an Institiúid. Tá na ráitis airgeadais ag teacht leis na leabhair chuntais.

## Nithe ar a dTuairiscím Eisceachtaí

Tuairiscím eisceachtaí

- mura bhfuair mé an fhaisnéis agus na mínithe ar fad a theastaigh uaim do m'iniúchadh, nó
- má d'aimsigh m'iniúchadh aon chás ábhartha nár feidhmíodh suimeanna airgid chun na gcríoch a bhí beartaithe nó sa chás nár lean na hidirbhearta do na húdaráis a rialaíonn iad, nó
- mura bhfuil an fhaisnéis a tugadh i dTuarascáil Bhliantúil na hInstitiúide ag teacht leis na ráitis airgeadais gaolmhara,
- mura gcomhlíonann Ráiteas na hInstitiúide maidir le Rialú Inmheánach Airgeadais Cód Cleachtais maidir le Rialachas Comhlachtaí Stáit, nó
- má fhaighim amach go bhfuil nithe ábhartha eile maidir leis an modh a riaradh gnó poiblí.

Níl a thuilleadh le tuairiscíú agam maidir leis na nithe seo lena mbaineann tuairisceoireacht eisceachtaí.



Colette Drinan

Le haghaidh agus thar ceann an Ard-Reachtair Cuntas agus Ciste

29 Meitheamh 2015



# Polasaithe Chuntasaíochta

## GINEARÁLTA

Bunaíodh an Institiúid faoin Acht um Institiúid Ard-Leighinn, 1940.

Áirítear ar a cuid feidhmeanna saoraidí a sholáthar le hard-léinn a chur chun cinn tuilleadh agus le taighde a dhéanamh i mbrainsí speisialtachta eolais.

Tá trí Scoil inti - Scoil an Léinn Cheiltigh, Scoil na Fisice Teoiriciúla agus Scoil na Fisice Cosmaí.

### 1. Bunús Cuntasaíochta

Tá na ráitis airgeadais ullmhaithe ar bhonn fabhráithe faoin gcoinbhinsiún costais stairiúil agus de réir chleachtas cuntasaíochta a nglactar leo tríd is tríd. Glactar le Caighdeán Thuairiscithe Airgeadais a bhí molta ag na comhlachtaí cuntasaíochta aitheanta mar is infheidhme iad.

### 2. Deontais Oireachtais

Taispeántar ioncam ar bhunús airgid isteach.

### 3. Sócmhainní Seasta

Is éard is Sócmhainní Seasta ann ná troscán, trealamh, ríomhairí agus mótarfheithiclí na hInstitiúide agus taispeántar iad ag costas lúide dímhéas carntha. Is mar seo a leanas atá na rátaí dímhéasa, ríofa ar bhunús dronlíneach:

Troscán agus Trealamh	10%
Ríomhairí	25%
Mótarfheithiclí	25%

Faightear áitribh atá i seilbh na hInstitiúide ar léas ó Oifig na nOibreacha Poiblí.

### 4. Cúlchiste Caipitil

Léiríonn cúlchiste caipitil luach neamh-amúchta ioncaim a úsáidtear le Sócmhainní Seasta a cheannach.

### 5. Leabharlann

Díscríobhtar caiteachas ar leabhair leabharlainne agus ábhair sa bhliain a dtabhaítear é.

### 6. Foilseacháin

Díscríobhtar caiteachas ar fhoilseacháin sa bhliain a dtabhaítear é.

## 7. Aoisliúntas Pinsin

Feidhmíonn Institiúid Ard-Léinn Bhaile Átha Cliath scéim phinsin shochair shonraithe a mhaoinítear go bliantúil ar bhonn íoc mar a imíonn tú ó chistí atá ar fáil dó, lena n-áirítear cistí a chuireann an Roinn Oideachais agus Scileanna ar fáil agus ó ranníocaíochtaí a asbhaintear ó thuarastail foirne.

Léiríonn costais phinsin na sochair phinsin a thuilleann fostaithe sa tréimhse agus léirítear iad glan ar ranníocaíochtaí pinsin foirne a bhíonn coinnte ag Institiúid Ard-Léinn Bhaile Átha Cliath. Aithnítear suim a chomhfhreagraíonn don mhuirear pinsin mar ioncam sa mhéid go bhfuil sé inaisghabhála, go ndéantar é a fhritháireamh in aghaidh deontais a bhíonn faighte sa bhliain chun íocaíochtaí pinsin a ghlanadh.

Tá gnóthachain nó cailteanais achtúireacha ar dhliteanais na scéime léirithe sa Ráiteas ar Ghnóthachain agus Caillteanais Aitheanta agus aithnítear coigeartú comhfhreagrach sa mhéid is féidir a aisghabháil ón Roinn Oideachais agus Scileanna.

Léiríonn na dliteanais phinsin luach reatha na n-íocaíochtaí pinsin don todhchaí atá tuillte ag an bhfoireann go dtí seo. Léiríonn maoiniú pinsin iarchurtha an tsócmhainn chomhfhreagrach a bheidh aisghafa i dtréimhsí amach anseo ón Roinn Oideachais agus Scileanna.

## 8. Tionscadail

Faigheann Institiúid Ard-Léinn Bhaile Átha Cliath maoiniú seachtarach ó thionscal, ó chomhlachtaí rialtais, agus ó Choimisiún na hEorpa. Coinnítear cairt chuntais i gcás gach tionscadail.

Léirítear ioncam agus caiteachas ar thionscadail sna ráitis airgeadais sa bhliain lena mbaineann siad. Taispeántar barrachas nó easnamh tionscadail sna ráitis airgeadais nuair a léirítear sin.

# Cuntas Ioncaim agus Caiteachais

	Notes	2014 €	2013 €
<b>Ioncam</b>			
Deontas Oireachtais		6,201,000	6,442,000
Glan-mhaoiniú iarchurtha do phinsin	11.c	1,338,169	1,372,232
Díolacháin Foilseachán		44,507	37,030
Tionscadail	2	1,533,675	1,143,236
Eile	3	39,095	55,481
		9,156,446	9,049,979
Aistriú (chuig)/ó Cúlchiste Caipitil	5	379,445	388,087
		9,535,891	9,438,066
<b>Caiteachas</b>	1		
Scoil an Léinn Cheiltigh		1,263,670	1,285,545
Scoil na Fisice Teoiriciúla		801,333	931,123
Scoil na Fisice Cosmaí		2,591,913	2,684,752
Riarachán		4,678,386	4,555,704
		9,335,302	9,457,124
<b>[Easnamh]/Barrachas don bhliain</b>		<b>200,589</b>	<b>[19,058]</b>
Iarmhéid amhail an 1 Eanáir		661,047	680,105
<b>Iarmhéid amhail an 31 Nollaig</b>		<b>861,636</b>	<b>661,047</b>
<b>Ráiteas ar Ghnóthachain agus Caillteanais Aitheanta</b>		<b>2014</b>	<b>2013</b>
[Easnamh]/Barrachas don bhliain		200,589	[19,058]
[Gnóthachain] iarbhire ar dhliteanais na scéime pinsin		309,000	[487,000]
Athruithe i dtoimhdí is bonn do luach reatha dhliteanais na scéime pinsin		[8,651,000]	2,794,000
<b>[Gnóthachan] achtúireach ar Dhliteanais Phinsin</b>	<b>11.b</b>	<b>[8,342,000]</b>	<b>2,307,000</b>
<b>Coigeartú ar Mhaoiniú an Phinsin Iarchurtha</b>		<b>8,342,000</b>	<b>[2,307,000]</b>
<b>[Gnóthachan] iomlán aitheanta don bhliain</b>		<b>200,589</b>	<b>[19,058]</b>

Is cuid de na ráitis airgeadais sin é an Ráiteas Beartais Cuntasaíochta agus nótaí 1 go dtí 16.



**Anders Ahlqvist**  
Comhalta Den Chomhairle

25 Meitheamh 2015



**Liam Breatnach**  
Comhalta Den Chomhairle

25 Meitheamh 2015

# Clár Comhardaithe

	Notáí	2014 €	2013 €
<b>Sócmhainní</b>			
Sócmhainní Seasta	4	1,352,903	1,732,348
Sócmhainní Reatha:			
Airgead sa Lámh agus ag an mBanc		2,464,057	3,420,292
Féichiúnaithe agus Réamhíocaíochtaí	7	173,199	178,282
Féichiúnaithe Tionscadal	2	36,883	44,306
<b>Sócmhainní Iomlána</b>		<b>4,027,042</b>	<b>5,375,228</b>
<b>Lúide Dlíteanais</b>			
Creidiúnaithe - Méideanna atá dlite laistigh de bhliain amháin			
Creidiúnaithe agus Fabhruithe	6	668,231	1,376,531
Creidiúnaithe Tionsadail	2.a	1,116,589	1,577,653
Creidiúnaithe - méideanna atá dlite tar éis bliana amháin	6	27,683	27,649
<b>Dlíteanais Iomlána Roimh Phinsin</b>		<b>1,812,503</b>	<b>2,981,833</b>
<b>Sócmhainní lúide dlíteanais Roimh Phinsin</b>		<b>2,214,539</b>	<b>2,393,395</b>
Maoiniú an Phinsin larchurtha	11.c	53,870,000	44,190,000
Dlíteanais Phinsin	11.b	[53,870,000]	[44,190,000]
		0	0
<b>Sócmhainní Glana</b>		<b>2,214,539</b>	<b>2,393,395</b>
<b>Maoinithe ag:</b>			
Cuntas Ioncaim agus Caiteachais		861,636	661,047
Cúlchiste Caipitil	5	1,352,903	1,732,348
		<b>2,214,539</b>	<b>2,393,395</b>

Is cuid de na ráitis airgeadais sin é an Ráiteas Beartais Cuntasaíochta agus nótaí 1 go dtí 16.



**Anders Ahlqvist**  
Comhalta Den Chomhairle

25 Meitheamh 2015



**Liam Breatnach**  
Comhalta Den Chomhairle

25 Meitheamh 2015

# Ráiteas Sreabhadh Airgid

	Nótaí	2014 €	2013 €
<b>Réiteach (easnamh)/barrachais oibríochta chuig glan-insreabhadh airgid ó ghníomhaíochtaí oibríochta</b>			
[Easnamh]/Barrachas don bhliain		200,589	[19,058]
Ús infhaighte	3	[19,979]	[36,229]
Ardú i gCreidiúnaithe		[708,265]	[189,766]
Laghdú i bhFéichiúnaithe		5,082	34,915
Glan-(laghdú)/ardú i gCláir Thaighde agus Táillí		[453,641]	103,605
Dímheas	4	440,087	515,330
Aistriú Cúlchiste Caipitil	5	[379,445]	[388,087]
Caillteanas ar dhiúscairt		117	-
<b>Glan(eis-sreabhadh)/insreabhadh Airgid tirim ó ghníomhaíochtaí oibríochta</b>		<b>[915,455]</b>	<b>20,710</b>
<b>Ráiteas Sreabhadh Airgid</b>			
Glan(eis-sreabhadh)/insreabhadh airgid tirim ó ghníomhaíochtaí oibríochta		[915,455]	20,710
<b>Aischiú ar infheistíochtaí agus seirbhísí airgeadais</b>			
Ús Bainc Infhaighte	3	19,979	36,229
<b>Caiteachas Caipitiúil</b>			
Ceannach Sócmhainní Inláimhsithe	4	[60,759]	[127,243]
<b>[Laghdú]/Ardú ar Airgead</b>		<b>[956,235]</b>	<b>[70,304]</b>
<b>Réiteach glaninsreabhadh airgead tirim chuig gluaiseacht i nglanchistí</b>			
[Laghdú]/Ardú ar Airgead Tirim		[956,235]	[70,304]
Iarmhéid faoin 1 Eanáir		3,420,292	3,490,596
<b>Iarmhéid faoin 31 Nollaig</b>		<b>2,464,057</b>	<b>3,420,292</b>

	Airgead infhaighte sa Bhanc €
I dtús na bliana 2014	3,420,292
Sreabhadh Airgid	[956,235]
<b>Ag deireadh na bliana 2014</b>	<b>2,464,057</b>

Is cuid de na ráitis airgeadais sin é an Ráiteas Beartais Cuntasaíochta agus nótaí 1 go dtí 16.



**Anders Ahlqvist**  
Comhalta Den Chomhairle

25 Meitheamh 2015



**Liam Breatnach**  
Comhalta Den Chomhairle

25 Meitheamh 2015

# Nótaí do na Ráitis Airgeadais

## 1. Anailís Shonraithe d'Ioncam & Caiteachas don bhliain dár críoch 31/12/2014

IONCAM	Nótaí	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riarachán €	2014 Iomlán €	2013 Iomlán €
Deontais Oireachtais		1,462,672	899,855	2,278,587	1,559,886	6,201,000	6,442,000
Glan-mhaoiniú iarchurtha do phinsin	11.c	[334,928]	[105,186]	[654,840]	2,433,123	1,338,169	1,372,232
Díolacháin Foilseachán		44,507	-	-	-	44,507	37,030
Ioncam Tionscadail	2.a	80,832	6,422	1,446,421	-	1,533,675	1,143,236
Ioncam Eile	3	-	-	423	38,672	39,095	55,481
		1,253,083	801,091	3,070,591	4,031,681	9,156,446	9,049,979
<b>Aistriú (chuig) ó Chúlchiste Caipitil</b>		-	-	-	379,445	379,445	388,087
		1,253,083	801,091	3,070,591	4,411,126	9,535,891	9,438,066
<b>CAITEACHAS</b>							
Costais Phárolla	8	1,091,008	722,606	1,496,222	703,971	4,013,807	4,239,173
*Costais Phinsin	11.a	[25,654]	[31,333]	[45,527]	2,596,943	2,494,429	2,470,820
*Costais Phinsin Tionscnamh	11.a	-	-	[2,299]	-	[2,299]	-
Costais Tionscnamh	2.a	78,758	6,422	904,232	-	989,412	1,135,297
Stóráil Leabharlaine agus Leabhar		46,196	65,769	49,841	-	161,806	163,217
Dímheas	4	-	-	-	440,087	440,087	515,330
Cíos, Rátaí agus Árachas		-	-	-	200,212	200,212	192,305
Costais Ghinearálta	9	22,989	525	33,416	253,029	309,959	152,386
Costais Taistil agus Seimineáir		20,544	22,888	59,712	8,336	111,480	83,066
Cothabháil Áitribh agus Slándáil		-	-	-	238,311	238,311	163,408
Costais ríomhairí agus Idirlín		1,327	13,305	85,606	53,214	153,452	111,938
Breosla Solas agus Cumhacht		-	-	-	150,537	150,537	147,793
Post agus Teileafón		-	-	-	24,338	24,338	27,067
Páipéarachas		9,862	149	6,258	5,781	22,050	20,563
Foilseacháin		16,005	-	3,077	-	19,082	15,962
Fógraíocht		2,604	332	902	1,375	5,213	2,745
Mion Trealamh Oifige		31	670	473	2,135	3,309	16,054
Caillteanas ar dhiúscairt	5	-	-	-	117	117	-
		1,263,670	801,333	2,591,913	4,678,386	9,335,302	9,457,124
<b>BARRACHAS/(EASNAMH) DON BHLIAIN</b>		<b>[10,587]</b>	<b>[242]</b>	<b>478,678</b>	<b>[267,260]</b>	<b>200,589</b>	<b>[19,058]</b>
Iarmhéid amhail an 1 Eanáir		272,307	97,788	1,109,797	[818,846]	661,047	680,105
<b>Iarmhéid amhail an 31 Nollaig</b>		<b>261,720</b>	<b>97,546</b>	<b>1,588,475</b>	<b>[1,086,106]</b>	<b>861,636</b>	<b>661,047</b>

**Nóta [a]:** \*Léiriú is ea glanshuim 11c agus 11a ar an aoisliúntas a íocadh lúide ranníocaíochtaí a asbhaineadh laistigh gach ceann de na scoileanna agus rannóga.

**Nóta [b]:** Cionroinneadh costais a bhaineann go díreach le taighde [m.sh. pá, leabharlann, costais ríomhaire, taisteal] ar an scoileanna. Gearradh forchostais ar nós cíós, árachas, fóntais agus cothabháil maoine ar Riarachán.

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 2.(a) Tionscadail

	2014 €	2013 €
Iarmhéideanna Tosaigh	1,533,347	1,429,742
Admhálacha	1,080,034	1,246,841
	2,613,381	2,676,583
Iarmhéideanna Deiridh [Féichiúnaithe €36,883 Creidiúnaithe €1,116,589]	[1,079,706]	[1,533,347]
Curtha i bhfeidhm mar ioncam	1,533,675	1,143,236
<b>Leithroinnt Ioncaim</b>		
Scoil an Léinn Cheiltigh	80,832	70,282
Scoil na Fisice Teoiriciúla	6,422	101,694
Scoil na Fisice Cosmaí	1,446,421	971,260
	1,533,675	1,143,236
Riarachán		
Ioncam Iomlán Tionscadal	1,533,675	1,143,236

### Costais Tionscadal

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	2014 Iomlán €	2013 Iomlán €
Íocaíochtaí chuig Páirtithe/ Comhlachais	11,630	-	107,602	119,232	75,035
Tuarastail/Scoláireachtaí	40,840	-	561,083	601,923	631,495
Taisteal	784	1,561	163,349	165,694	290,221
Eile	25,504	4,861	72,198	102,563	138,546
Costas Iomlán Tionscadal	78,758	6,422	904,232	989,412	1,135,297

### 2.(b) Sonraí Tionscadail

Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach	Curtha i bhfeidhm mar Ioncam [Caipiteal san áireamh] €	Iarmhéid Deiridh €	Caipiteal €
<b>Scoil an Leinn Cheiltigh</b>						
Irish Script on Screen	16,858	-	147	2,221	14,637	[2,074]
Celtic Summer School	12,960	20,435	24,602	24,602	8,793	-
Ogham	28,923	30,000	54,009	54,009	4,914	-
<b>Iomlán-Leánn Ceilteach</b>	<b>58,741</b>	<b>50,435</b>	<b>78,758</b>	<b>80,832</b>	<b>28,344</b>	<b>[2,074]</b>



## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 2.(b) Sonraí Tionscadail [ar lean]

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach	Curtha i bhfeidhm mar Ioncam [Caipiteal san áireamh] €	Iarmhéid Deiridh €	Caipiteal €
<b>Scoil na Fíisce Teoiriciúla</b>							
Bethe Ansatz	SFI	11,233	-	-	-	11,233	-
T.Tchrakian	EC	12,671	-	1,637	1,637	11,034	-
Veselin Filev Inspire Award	SFI	5,858	-	-	-	5,858	-
M.Ihl Fellow	IRCSET	10,124	-	-	-	10,124	-
G. Kells	IRCSET	-	4,335	4,785	4,785	[450]	-
<b>Iomlán-Físic Theoiriciúil</b>		<b>39,886</b>	<b>4,335</b>	<b>6,422</b>	<b>6,422</b>	<b>37,799</b>	<b>-</b>
<b>Scoil na Fíisce Cosmaí</b>							
Gamma Ray Bursts	SFI	13,543	-	-	-	13,543	-
<b>Iomlán-Réalteolaíocht</b>		<b>13,543</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>13,543</b>	<b>-</b>
Dos Max	EC	1,502	-	-	1,502	-	-
CosmoGrid	PRTL	509,056	-	-	509,056	-	-
Nam Conference	A. Observ'tory	29,769	-	-	-	29,769	-
Jetset	EC	6,637	-	4,737	4,737	1,900	-
GNM	SFI	13,740	-	4,118	4,118	9,622	-
E-Inis -Cycle 4	PRTL	263,891	[143,964]	[3,928]	[3,928]	123,855	-
Pic Simulations	SFI	60,789	-	3,041	3,041	57,748	-
D.Coffey Fellow	IRCSET	6,350	-	-	-	6,350	-
KM3Net -PP	EC	10,813	-	6,447	6,447	4,366	-
E.Whegan Inspire	IRCSET	8,452	-	1,703	1,703	6,749	-
NGST Project	ESA	[35,073]	149,635	110,558	113,734	828	[3,176]
Dobies	ESA	2,912	-	2,325	2,912	-	-
KVM3Net	EC	7,136	-	195	195	6,941	-
Valenti EC Reintegration	EC	12,486	-	4,500	4,500	7,986	-
Aleks Scholz-Brown Dwarfs	SFI	27,201	-	15,160	15,160	12,041	-
Origin of Jets	SFI	22,171	20,178	24,856	24,856	17,493	-
EASY T. Ray 2014	SFI	-	269,214	57,389	69,235	199,979	[11,846]
<b>Iomlán-Réaltfhisic</b>		<b>947,832</b>	<b>295,063</b>	<b>231,101</b>	<b>757,268</b>	<b>485,627</b>	<b>[15,022]</b>

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 2.(b) Sonraí Tionscadail (ar lean)

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach	Curtha i bhfeidhm mar ioncam [Caipiteal san áireamh] €	Iarmhéid Deiridh €	Caipiteal €
Samtex	Industry	16,546	-	2,780	2,780	13,766	-
Geo External Funds	Industry	5,544	8,050	7,759	7,759	5,835	-
Joint RFP	SFI	5,213	-	5,213	5,213	-	-
Isle 2	SFI	5,918	-	501	501	5,417	-
Geophysics Schools Seismology	Various	6,905	2,050	-	-	8,955	-
Dynamics of Continuity	SFI	7,347	-	4,790	4,790	2,557	-
TopoMed	IRCSET	22,495	-	14,487	14,487	8,008	-
Regional Seismic	SFI	[9,233]	15,160	1,972	1,972	3,955	-
CTBTO	Dept.For.Affairs	-	3,989	-	1,058	2,931	[1,058]
Irish Geoscience Graduate Prog.	Dept. Commun.	37,233	6,125	40,280	40,280	3,078	-
IRETHERM	SFI	197,275	181,703	200,477	198,178	180,800	-
GIANICE 11	SFI	61,530	19,545	23,675	23,675	57,400	-
SIRG E2174	SFI	44,194	140,397	145,543	147,087	37,504	[1,544]
ESA UWB Grant	ESA	34,835	-	2,171	2,171	32,664	-
WAXI	Industry	12,309	58,668	46,059	46,059	24,918	-
IRECCSEM	SFI	25,234	52,275	106,005	113,942	[36,433]	[7,937]
Crust	SFI	-	142,239	4,128	6,976	135,263	[2,848]
PIPCO		-	100,000	67,291	72,225	27,775	[4,934]
<b>Iomlán-Geoifisic</b>		<b>473,345</b>	<b>730,201</b>	<b>673,131</b>	<b>689,153</b>	<b>514,393</b>	<b>[18,321]</b>
<b>Iomlán Físic Chosmach</b>		<b>1,434,720</b>	<b>1,025,264</b>	<b>904,232</b>	<b>1,446,421</b>	<b>1,013,563</b>	<b>[33,343]</b>
<b>Iomlán DIAS</b>		<b>1,533,347</b>	<b>1,080,034</b>	<b>989,412</b>	<b>1,533,675</b>	<b>1,079,706</b>	<b>[35,417]</b>

#### Nótaí

Cuirtear fáiltais tionscadail i bhfeidhm mar ioncam tionscadail, ag leibhéal arb ionann an caiteachas bliantúil ag an tionscadal lena mbaineann siad.

Léiriú is ea na comhorduithe dúnta thuas ar forchostas a tuilleadh go dáta agus maoiniú roimh ré chun freastal ar thiomantais airgeadais i 2015.

Léiríonn an colún caipitil an caiteachas ar shócmhainní seasta i rith 2014.

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 3. Ioncam Eile

	2014	2013
	€	€
Ús bainc	19,979	36,229
Táillí & Deontais	11,399	1,597
Eile	7,717	17,655
<b>Iomlán</b>	<b>39,095</b>	<b>55,481</b>

### 4. Sócmhainní Seasta

	Troscán & Trealamh	Mótarfheithicilí	Ríomhairí	Iomlán
	€	€	€	€
<b>Costais</b>				
Iarmhéid Tosaigh 1/1/2014	3,895,554	45,700	2,233,444	6,174,698
Breiseanna *	6,950	-	53,809	60,759
Riарtha **	[141,255]	-	[12,346]	[153,601]
	3,761,249	45,700	2,274,907	6,081,856
<b>Dímheas</b>				
Iarmhéid Tosaigh 1/1/2014	2,643,680	44,245	1,754,425	4,442,350
Muirear	228,329	438	211,320	440,087
Riарtha	[141,138]	-	[12,346]	[153,484]
	2,730,871	44,683	1,953,399	4,728,953
Luach glan de réir na leabhar 31/12/2014	1,030,378	1,017	321,508	1,352,903
Luach glan de réir na leabhar 31/12/2013	1,251,874	1,455	479,019	1,732,348

#### Nota

\* Caipitlítear na sócmhainní seasta de bhreis ar €1,000 i leabhair DIAS.

\*\* Mar thoradh ar chleacht deimhnithe um shócmhainn ríomhaireachta, nuashonraíodh an clár chun an líon mór diúscairtí a rinneadh i mblianta roimhe sin a léiriú.

### 5. Cúlchiste Caipitil

	2014	2013
	€	€
Iarmhéid amhail an 1 Eanáir	1,732,348	2,120,435
<b>Aistriú ó/(chuig) Cuntas Ioncaim agus Caiteachais</b>		
Ioncam leithroinnte le sócmhainní seasta a fháil [Maoinithe ag Tionascadal]	35,417	11,258
Ioncam leithroinnte le sócmhainní seasta a fháil [Maoinithe ag an Stáitchiste]	25,342	115,985
Amúchadh ag teacht le dímheas sócmhainní	[440,087]	[515,330]
Méid scaoilte ar dhiúscairtí	[117]	-
	[379,445]	[388,087]
<b>Iarmhéid amhail an 31 Nollaig</b>	<b>1,352,903</b>	<b>1,732,348</b>

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 6. Creidiúnaithe - Méideanna atá dlite laistigh de bhliain amháin

	2014 €	2013 €
Creidiúnaithe Trádála	123,860	82,872
Fabhruithe	157,193	973,237
Ilnithe	-	12,004
CBL	39,233	17,955
Creidiúnaithe Ioncaim	131,623	129,534
Cuntas Rialúcháin Pinsean	216,322	160,929
	668,231	1,376,531

### Creidiúnaithe dlite tar éis dhá mhí dhéag

	2014 €	2013 €
Comhdhéanta as:		
Vernam Hull Bequest	25,223	25,189
Carmody Fund	2,460	2,460
	27,683	27,649

Tá an t-airgead a bhaineann leo seo sealbhaithe mar éarlais.

### 7. Féichiúnaithe

	2014 €	2013 €
Réamhíocaíochtaí	150,033	159,970
Féichiúnaithe-Díolacháin Leabhar	1,511	2,777
Ilnithe	21,655	15,535
	173,199	178,282

### 8. Costais Phárolla

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2014 Iomlán €	2013 Iomlán €
Tuarastal/Pá	951,170	618,852	1,339,315	703,971	3,613,308	3,893,862
Scoláireachtaí	136,040	94,019	145,890	-	375,949	327,669
Cuairteoirí	3,198	9,735	11,017	-	23,950	15,770
Airgead Dinigh	600	-	-	-	600	1,872
	1,091,008	722,606	1,496,222	703,971	4,013,807	4,239,173

#### Nota

Tocadh luach €253,145 (2013:€287,267) laghdúithe tabhaidh pinsin leis on Roinn Oideachais agus Scileanna I rith 2014.  
Líon Foirne 52.5 (2013:55.5), Líon ECF 55 (2013: 56).

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 9. Costais Ghinearálta

	Léann Cheilteach	Fisic Theoiriciúil	Fisic Chosmach	Riar.	2014 Iomlán	2013 Iomlán
	€	€	€	€	€	€
Ilghnéitheach	18,640	381	29,051	88,456	136,528	45,464
Tionscnaimh cur chun cinn/Lóin	3,854	144	3,997	4,142	12,137	15,224
Táillí Gairmiúla	-	-	-	113,102	113,102	36,099
Oiliúint	495	-	300	1,031	1,826	5,684
Táille Iniúchta	-	-	-	18,800	18,800	18,800
Muirir Bhainc	-	-	-	2,368	2,368	2,568
Costais Cruinnithe Boird	-	-	-	20,124	20,124	22,170
Sláinte agus Sábháilteacht	-	-	68	5,006	5,074	6,377
	<b>22,989</b>	<b>525</b>	<b>33,416</b>	<b>253,029</b>	<b>309,959</b>	<b>152,386</b>

### 10. Léasáil

#### Léasanna Oibríochta

Tá na háitribh atá i seilbh na hInstitiúide ar léas ó Oifig na nOibreacha Poiblí.

Is iad na háitribh a n-airítear ná Réadlann Dhún Since, 5 Cearnóg Mhuirfean, 9-10 Bóthar Burlington agus 31 Plás Mhic Liam.

Tá téarma 84 bliana fágtha ar an léas do Réadlann Dhún Since agus athnuaitear na léasanna eile ar bhonn bliantúil.

Is é tiomantas ar bhonn léasanna den sórt sin maidir le 2015 na €113,609.

Léasanna Oifig na nOibreacha Poiblí	Cíos Bliantúil €
Réadlann Dhún Since	330
5, Cearnóg Mhuirfean	5,022
9-10 Bóthar Burlington	50,167
31, Plás Mhic Liam.	58,090
	<b>113,609</b>

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 11. Costais Pinsean

a) Anailís ar na costais iomlána pinsin curtha chun dochair do Chaiteachas	2014 (€'000)	2013 (€'000)
Costas seirbhíse reatha	953	1,019
Ús ar Dhliteanais na Scéime Pinsin	1,669	1,593
Ranníocaíochtaí Fostaí	[130]	[141]
	<b>2,492</b>	<b>2,471</b>

b) Gluaiseacht i nGlan-Dlitéanas Pinsin i rith na bliana airgeadais	2014 (€'000)	2013 (€'000)
Glan-Dlitéanas Pinsin amhail an 1 Eanáir	[44,190]	[45,125]
An Costas Seirbhíse Reatha	[953]	[1,019]
Costais Úis	[1,669]	[1,593]
[Gnóthachan]/caillteanas achtúireach	[8,342]	2,307
Pinsin íoctha sa bhliain	1,284	1,240
<b>Glan-Dlitéanas Pinsin amhail an 31 Nollaig</b>	<b>(53,870)</b>	<b>[44,190]</b>

#### c) Cistiú Iarchurtha do Phinsin

Aithníonn DIAS na méideanna seo mar shócmhainn a chomhfhreagraíonn don dlitéanas iarchurtha neamh-mhaoinithe do phinsin bunaithe ar na toimhdí thuaslaithe agus ar roinnt imeachtaí a tharla cheana. Áirítear ar na himeachtaí seo an bonn reachtúil chun sceim aoisliúntais a bhunú, agus an polasaí agus an cleachtas i ndáil le pinsin seirbhíse poiblí a mhaoiniú, lena n-áirítear ranníocaíochtaí ag fostóirí agus próiseas na meastachán bliantúil. Cé nach bhfuil aon socrú foirmiúil maidir leis na méideanna sonracha seo déanta leis an Roinn Oideachais agus Scileanna, níl aon fhianaise ag DIAS nach leanfaidh an polasaí maoinithe seo de bheith ag freastal ar a leithéid de shuímeanna de réir an chleachtais reatha. Sa Chuntas Ioncam agus Caitheachais, aithníodh an Glan-Mhaoiniú Iarchurtha do Phinsin sa bhliain mar seo leanas:

	2014 (€'000)	2013 (€'000)
Maoiniú inaisghabhála i ndáil le costais pinsin na bliana reatha	2,622	2,612
Deontas Stáit feidhmithe chun pinsinéirí a íoc	[1,284]	[1,240]
	<b>1,338</b>	<b>1,372</b>

Ba í €53.870 milliún (2013: €44.190 milliún) an tsócmhainn mhaoinithe iarchurtha do phinsin amhail an 31 Nollaig 2014.

d) Stair na nOibleagáidí faoin scéim shochair shainithe.	2014 (€'000)	2013 (€'000)	2012 (€'000)
Oibleagáidí shochair shainithe.	53,870	44,190	45,125
[Gnóthachan]/caillteanas iarbhire ar dhliteanais na scéime.	309	[487]	2,499
Céatadán de luach dhliteanais na scéime.	0.60%	[1.10%]	5.50%

Tá [gnóthachan]/caillteanas achtúireach carnach €4,941,000 aitheanta sa Ráiteas d'Iomlán na nGnóthachan agus na gCaillteanas Aitheanta.



## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 11. Costais Pinsean [ar leanúint]

#### e) Cur síos ginearálta ar an Scéim

Is é atá sa scéim pinsean ná socrú aoisliúntais shochair shonraithe chríoch-thuarastail le sochair agus ranníocaíochtaí faoi threoir rialachán reatha scéime 'eiseamláire' na hearnála poiblí. Soláthraíonn an scéim pinsean [ochtóidí in aghaidh na bliana seirbhíse], aisce nó cnapshuim [trí hochtóidí in aghaidh na bliana seirbhíse] agus pinsin do chéilí agus leanaí. De ghnáth, is é an 65ú breithlá an aois scoir agus tá baill a thosaigh roimh 2004 i dteideal éirí as ag aois 60 gan aon laghdú achtúireach. De ghnáth, méadaíonn na pinsin atá á n-íoc [agus pinsin iarchurtha] de réir bhoilsciú ginearálta na hearnála poiblí.

Bunaíodh an luacháil a úsáideadh i gcás nochtadh faisnéise faoi FRS17 ar luacháil iomlán achtúireach a rinne achtúire neamhspleách cáilithe a chuir ceanglais FRS san áireamh chun dliteanais na scéime amhail an 31 Nollaig 2014 a mheasúnú. Is mar a leanas a bhí na príomh-thoimhdí achtúireacha a úsáideadh:

	At 31/12/14	At 31/12/13	At 31/12/12
Ráta na nArduithe Tuarastail	2.50%	3.00%	3.00%
Ráta na nArduithe Pinsin atá á n-íoc	2.00%	2.50%	2.50%
Ráta Lascaine	2.25%	3.75%	3.50%
Ráta Boilscithe	1.50%	2.00%	2.00%

Leis an mbonn mortlaíochta atá á leanadh, is féidir dul chun cinn in ionchas saoil le himeacht ama a chur san áireamh; mar sin, braithfidh ionchas saoil ag dul ar scor ar an mbliain a shroichfidh ball aois scoir [65 bliana]. Léiríonn an tábla thíos ionchas saoil na mball a shroichfidh aois 65 in 2014 agus in 2034.

	2014	2034
Aois 65 sa bhliain		
Ionchas saoil – fir	87.3	89.9
Ionchas saoil – mná	88.7	90.9

### 12. Nochtadh Idirbheartaíochtaí

Glacann Comhairle na hInstitiúide le nósanna imeachta de réir threoirilínte atá eisithe ag an Roinn Airgeadais maidir le leasanna a nothaíonn Comhaltaí na Comhairle agus chloígh Comhaltaí na Comhairle leis na nósanna imeachta sin le linn na bliana. Níor léirigh aon Chomhalta de chuid na Comhairle leas.

## Nótaí do na Ráitis Airgeadais [ar leanúint]

### 13. Nochtadh Comhaltaí na Comhairle/Tuarastal an Chláraitheora, Táillí agus Costais

	Luach Saothair Iomláin 2014 €	Speansais Iomlána 2014 €	Luach Saothair Iomláin 2013 €	Speansais Iomlána 2013 €
<b>Comhalta den Chomhairle</b>				
Dr Vincent Cunnane		1,551		261
<b>Baill ceaptha ag Boird Rialaithe na gComhScoileanna</b>				
An tOllamh Gerry Wrixon		336		126
An tOllamh Arthur Jaffe		2,065		1,325
An tOllamh Anders Ahlqvist		3,860		7,262
An tOllamh Werner Nahm				
An tOllamh Luke Drury				
An tOllamh Pdraig Breatnach				
<b>Cláraitheoir</b>				
Cecil Uasal Keaveney *	97,906		100,756	
	97,906	7,812	100,756	8,974

#### \* Nóta

Faigheann an Cláraitheoir turastail anháin. Ní íochtar aon bhónas leis. Ní sháraíonn teidlíochtaí pinsin an Chláraitheora gnáththeidlíochtaí scéim aoisliúntais le sochar sainithe na hearnála poiblí.

### 14. Líon Fostaithe le Sochair í 2014 a thagann laistigh de bhandaí €10,000 ó €60,000 ar aghaidh

Líon fostaithe le sochair €60k	Líon fostaithe le sochair €70k	Líon fostaithe le sochair €90k	Líon fostaithe le sochair €100k	Líon fostaithe le sochair €110k	Líon fostaithe le sochair €120k	Líon fostaithe le sochair €130k
1	6	4	1	1	3	4

### 15. Ranníocaíochtaí Pinsin Fostóra

Ranníocaíochtaí Fostóra í 2014 = €49,094.

### 16. Ceadú Cuntais

Cheadaigh an Chomhairle na Ráitis Airgeadais ar an 25 Meitheamh 2015.



